DOCUMENT RESUME

ED 401 342 TM 026 211

AUTHOR	Abramson, Robert; And Others
TITLE	Schools and Staffing Survey: Sample Design and Estimation. 1993-94. Technical/Methodology Report.
INSTITUTION	Bureau of the Census (DOC), Suitland, Md.; National Center for Education Statistics (ED), Washington, DC.
REPORT NO	NCES-96-089
PUB DATE	Oct 96
NOTE	158p.
PUB TYPE	Reports - Descriptive (141) -- Statistical Data (110)
EDRS PRICE	MF01/PC07 Plus Postage.
DESCRIPTORS	Elementary Secondary Education; *Estimation (Mathematics); *Institutional Characteristics; National Surveys; Private Schools; Public Schools; Research Design; *Sampling; School Districts; School Libraries; *Statistical Analysis; Tables (Data); *Teacher Characteristics; Teachers
IDENTIFIERS	*Schools and Staffing Survey (NCES)

ABSTRACT

The Schools and Staffing Survey (SASS) of the National Center for Education Statistics provides periodic, timely data on public and private elementary and secondary schools in the United States. Data collected include: school and teacher characteristics; school operations, programs, and policies; teacher demand and supply; and the opinions of teachers and administrators about policies and working conditions. Data are collected through seven surveys conducted during the same school year. This report documents the sample design and estimation procedures for the third SASS collection, conducted in 1993-94, in which 13,000 schools and administrators and 67,000 teachers were selected. In addition, 5,500 local education agencies associated with selected schools and 100 districts not associated with selected schools were studied. Some 7,600 school libraries and librarians and 6,900 students were also surveyed. The report describes: (1) school and teacher sample stratum allocation; (2) overlapping 1991 and 1994 SASS samples; (3) public school and principal sample design; (4) local education agency sample design; (5) private school and principal sample design; (6) teacher sample design; (7) public and private school library and librarian sample; (8) public and private school student sampling design; (9) weighting; (10) imputation; (11) variance estimation techniques; and (12) frame evaluation. Five appendixes present supporting data about data analysis techniques. (Contains 26 tables, 35 figures, and 20 references.) (SLD)

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Technical/Methodology Report October 1996

1993–94 Schools and Staffing Survey: Sample Design and Estimation

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Suggested Citation

U.S. Department of Education. National Center for Education Statistics. *1993–94 Schools and Staffing Survey: Sample Design and Estimation*, NCES 96-089, by Robert Abramson, Cornette Cole, Sharon Fondelier, Betty Jackson, and Randall Parmer. Project Officer, Steven Kaufman. Washington, DC: 1996.

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1. Introduction

1.1 General Goals

The National Center for Education Statistics (NCES) sponsors the Schools and Staffing Survey (SASS) in order to provide periodic, timely data on public and private elementary and secondary schools in the United States. Data collected include school and teacher characteristics, school operations, programs and policies, teacher demand and supply, and the opinions of teachers and administrators about policies and working conditions. These SASS components are: "Teacher Demand and Shortage Survey", the "School Survey", the "School Administrator Survey", the "Teacher Survey", the "Library Survey", the "Librarian Survey", and the "Student Survey". These surveys are all collected during the same school year. Additionally, the Teacher Follow-up Survey (TFS) is conducted on a subsample of the Teacher Survey sample one year after the Teacher Survey is conducted. The integration of all of these elements produces files that can provide linkage of data between the LEAs (local education agencies), schools, principals, libraries, librarians, teachers, and students. To accomplish this integration:

1. Schools were selected first. Each selected school received a school questionnaire and an administrator questionnaire.

2. A sample of school libraries and librarians was selected from the school sample. Each received a library as well as a librarian questionnaire.

3. A sample of teachers was selected within each selected school. The average teacher sample size per school was approximately five. Each selected teacher received a teacher questionnaire.

4. A subsample of schools for the student sample was selected from the school sample. A subsample of three teachers was selected from the sampled teachers in 3 above, within the student sample schools. A sample of two students from each teacher was selected.

5. For public schools, the LEAs associated with the selected schools received a Teacher Demand and Shortage (TDS) questionnaire. An additional sample of districts not associated with schools was selected and received the TDS questionnaire. The school questionnaire for private schools included TDS questions for the school.

See Figure 1a for an illustration of the 1993-94 SASS sampling process.

The SASS was first conducted by the Bureau of the Census during the 1987-88 school year and was repeated for the 1990-91 school year. This report documents the sample design and estimation procedures for the third SASS collection. It was conducted during the 1993-1994 school year, and is referred to as 1994 SASS in this document. Some 13,000 schools and administrators, and 67,000 teachers were selected. In addition, 5,500 local education agencies associated with the selected schools and 100 districts not associated with schools were selected in 1994 SASS. Some 7,600 school libraries and librarians, and 6,900 students were also selected.

The SASS is designed to provide the following estimates to meet its analytic goals:

1. national estimates for public and private schools;

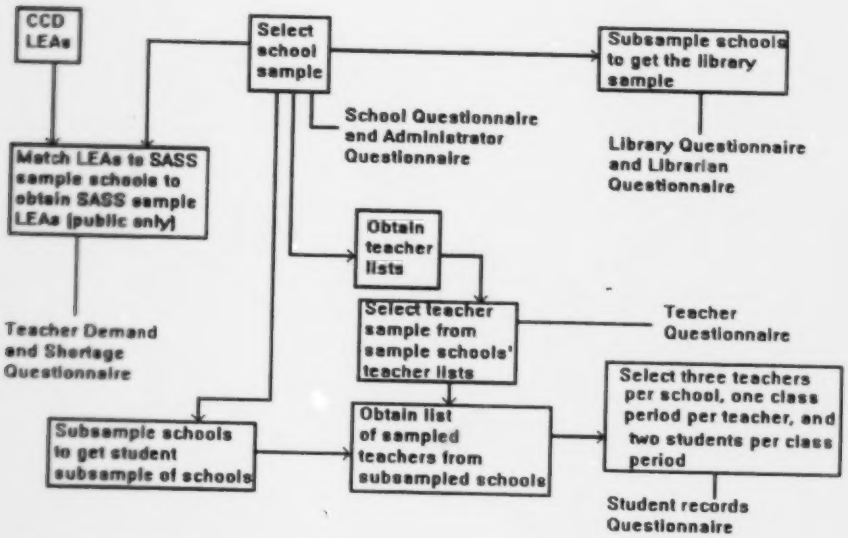
2. state estimates for public schools, libraries, and librarians;

3. state/elementary, state/secondary, and national combined public school estimates (see section 5.1.2 for the definition of elementary, secondary and combined schools);

4. detailed association estimates and grade level estimates for private schools;

5. estimates of change from 1991 to 1994 in school level characteristics;

Figure 1a.--The 1993-94 SASS Sampling Process


CCD LEAs
Select school sample
Subsample schools to get the library sample
School Questionnaire and Administrator Questionnaire
Library Questionnaire and Librarian Questionnaire
Match LEAs to SASS sample schools to obtain SASS sample LEAs (public only)
Obtain teacher lists
Select teacher sample from sample schools' teacher lists
Teacher Questionnaire
Teacher Demand and Shortage Questionnaire
Select three teachers per school, one class period per teacher, and two students per class period
Subsample schools to get student subsample of schools
Obtain list of sampled teachers from subsampled schools
Student records Questionnaire

6. national estimates of public and private student demographic information;

7. national estimates for schools with greater than 19.5% American Indian or Alaskan Native enrollment (Sometimes referred to simply as Indian);

8. national estimates for schools, libraries, librarians and students from schools operated by the Bureau of Indian Affairs (BIA);

9. national estimates for public and private school libraries, librarians, and students by school grade level and urbanicity;

10. national estimates for private school libraries, librarians, and students by major affiliation (Catholic, other religious, and nonsectarian);

This report describes the procedures used for the: 1. school and teacher sample stratum allocation, 2. overlapping 1991 and 1994 SASS samples, 3. public school and principal sample design, 4. LEA sample design, 5. private school and principal sample design, 6. teacher sample design (including within school teacher allocation), 7. public and private school library and librarian sample design, 8. public and private student sample design, 9. weighting, 10. imputation, 11. variance estimation techniques, and 12. frame evaluation.

1.2 Response Rates

Below are the unweighted and weighted questionnaire response rates for the SASS components, as well as the weighted overall response rates. The unweighted questionnaire response rates are defined as the number of in-scope (eligible for interview) responding questionnaires divided by the number of in-scope sample cases. The weighted questionnaire response rates are defined the same way, using the basic weighted (inverse of the probability of selection) instead of unweighted numbers. The weighted overall response rates are defined as the weighted questionnaire response rates times the rate at which the sample schools cooperated with the sampling at each stage of the sampling. The overall response rate for a particular item (overall response rate times item response rate) may be lower than the respective response rates because the individual item nonresponse rates are not included in Table 1.

Table 1.--Weighted and Unweighted Questionnaire Response Rates and Weighted Overall Response Rates

Survey Type	Unweighted Questionnaire Response Rate	Weighted Questionnaire Response Rate[1]	Weighted Overall Response Rate[2]
Teacher Demand and Shortage (LEA)	93.1	93.9	93.9
Public School Administrator	96.6	96.6	96.6
Private School Administrator	90.3	87.6	87.6
Indian School Administrator	98.7	98.7	98.7
Public School	92.0	92.3	92.3
Private School	84.1	83.2	83.2
Indian School	99.3	99.3	99.3
Public Teacher	88.9[3]	88.2[3]	83.8
Private Teacher	80.6[4]	80.2[4]	73.0
Indian Teacher	87.1	86.6	86.6
Public School Library	91.1	90.1	90.1
Public School Librarian	93.5	92.3	92.3
Private School Library	77.7	70.7	70.7
Private School Librarian	83.9	76.5	76.5
Indian Library	89.4	89.4	89.4
Indian Librarian	88.3	88.3	88.3
Public School Student	90.2[5]	91.3[5]	80.3
Private School Student	87.6[6]	88.1[6]	69.6
Indian School Student	93.7[7]	92.5[7]	87.0

[1]Weighted using the inverse of the probability of selection.

[2]Weighted Questionnaire Response Rate times the rate of cooperation with the sampling of the sample schools at each stage of the selection.

[3]These rates do not include the 5 percent of public schools that did not provide teacher lists.

[4]These rates do not include the 9 percent of private schools that did not provide teacher lists.

[5]These rates do not include the 12 percent of public schools that did not participate in student sampling.

[6]These rates do not include the 21 percent of private schools that did not participate in student sampling.

[7]These rates do not include the 6 percent of Indian schools that did not participate in student sampling.

Source: 1993-94 Schools and Staffing Survey - all components.

Table 2.-- Unweighted Overlap/Nonoverlap Questionnaire Response Rates

Survey Type	Overlap Response Rate	Nonoverlap Response Rate
Public School	91.8	92.1
Private School	87.9	82.8

Source: 1993 - 94 Schools and Staffing Survey - School Components.

A future report will examine survey response rates and possible bias in more detail for the 1993-94 SASS. An examination of non-response on the 1990-91 SASS can be found in Scheuren et al. (1996) and Monaco et al. (1996).

Table 2 provides the 1994 unweighted response rates for schools being asked to respond to SASS in: 1) both 1991 and 1994 (overlap units), and 2) 1994 only (nonoverlap). See section 4 for more information concerning the selection of overlap schools.

1.3 Changes in SASS Design from 1988 to 1994

Various changes were made to the SASS design between survey years 1988 to 1991 and 1991 to 1994 to improve SASS estimates. The 1991 to 1994 changes are discussed below, along with the implications of the design changes over the years.[1]

1.3.1 Changes in SASS Design from 1991 to 1994

Below is a summary of the changes made in the 1994 sample:

1. To improve the precision of the 1994 private sector estimates, the frame resulting from the 1991-92 Private School Survey (PSS) updated with affiliation list matching results (See Section 5.3.2) was used as the sampling frame for the 1993-94 SASS private schools. See appendix 1 for more information about PSS.

   The 1994 private school stratum definitions were based on the 1991-92 PSS school reports of association membership and affiliation.

2. Private school weights were adjusted so that 1993-94 SASS school totals would agree with 1993-94 PSS school totals. See section 9.1 for an explanation for why this was done.

3. For the private sector, the sample was reallocated to publish estimates for one additional association - for a total of 19 associations.

4. In 1994, a library/librarian survey was initiated, as well as a student survey.

5. The cutoff for the Native American schools was changed to an enrollment greater than 19.5% instead of 25%.

6. The schools in the BIA stratum were selected with certainty.

7. CATI facilities were used extensively for the nonresponse follow-up of the teacher survey, librarian survey, library survey, public school survey, and administrator survey.

8. Teacher lists from sample schools were keyed, allowing for better control over sample sizes by stratum and improving the effectiveness of the sort.

[1] The 1988 to 1991 design changes are discussed in Kaufman, Steven and Huang, H. (1993).

9. Administrators who teach were eligible for the teacher sample, in addition to receiving an administrator questionnaire.

10. Collapsing criteria were altered slightly for the LEA weighting. See Section 9.4 for more details.

1.3.2 Concerns about SASS change estimates from 1988 to 1994.

Care must be taken when estimating change from 1988 to 1994 in a SASS data element, because some of the change may be due to change in sample design, as opposed to change in the education system (for example a 30% increase in the number of schools in Nebraska). Below are sample design changes that might affect the measurement of change over time.

1.3.2.1 Changing the sampling frame from QED to CCD

Beginning with the 1990-91 SASS, the sampling frame for public schools was changed. A change in the sampling frame is of some concern because the definition of a school is different between the two frames. In the 1987-88 SASS, a school was defined as a physical location based in information included in the Quality Education Data (QED)[2] file. In the 1990-91 SASS, a school was defined as an administrative unit with a principal based on information included in the Common Core of Data (CCD)[3] file. In states which have multiple administrative units in a single physical location, the estimated change in the number of schools could increase. This increase is at least partially caused from the definition difference.

It is possible to collapse the 1993-94 SASS school sample to reflect the QED definition of a school as defined in the 1987-88 SASS, thereby eliminating this concern. However, resulting estimates will no longer be consistent with CCD estimates.

To the extent that the coverage between CCD and QED are different, then part of the change in school related estimates can be attributable to this coverage difference.

1.3.2.2 Adjusting the estimated number of teachers from the teacher file to the estimated number of teachers from the school file

This was done, beginning with 1990-91 SASS, to make estimates in the files more consistent. Since this was not done in the 1987-88 survey, some observed distributional differences between the 1987-88 and 1994 teacher files may be partially attributable to this adjustment. In the public 1987-88 SASS files, the teacher counts on the teacher file are smaller than the counts on the school file. In the 1993-94 SASS files, the teacher file counts are increased to equalize the estimates. This increase does not reflect a change in the educational system, but a bias correction differentially applied between the files.

1.3.2.3 Imputing for missing data on the administrator and teacher files

All data files are adjusted for complete refusals. However, for the 1988 administrator and teacher files, missing data elements within responding units are not imputed. Hence, estimates of totals implicitly use a value of zero for all missing data elements (i.e., 1988 totals are underestimates whenever there are missing data). Beginning with 1991, and again for 1994, estimates of totals use imputed values for missing data elements. Therefore, some of the measured change

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[2]The QED (Quality Education Data) file was produced by Quality Education Data, Inc., a company that produces mailing lists of educational institutions.

[3]The Common Core of Data is a file of all schools and school districts compiled by the National Center for Education Statistics from data supplied by all state agencies.

between the 1988 and 1994 totals is due to imputing one year, but not the other. This part of the change is not due to a change in the educational system.

Change estimates for ratios and averages are also affected by imputations in one year, but not the other. However, the magnitude and direction of the bias is unknown and dependent on the variable of interest. This part of the change is not due to a change in the educational system.

1.3.2.4 Questionnaire and conceptual differences

Care must be observed in the interpretation of change estimates between 1988 and 1994, since specific questions are not always worded the same from the first SASS survey to subsequent surveys.[4] Both major and minor changes in wording of specific items occur; the ordering of items may be different and concepts can be different.

As an example, in both the 1987-88 and 1990-91 SASS, the question, "Which best describes the community in which the school is located?" was asked of the principal (for the school survey) and the respondent to the school survey. The SASS re-interview program in both 1988 and 1991 determined the responses to this item were highly subjective and exhibited moderate response variance.[5] As a result of this finding, the 1991 and 1994 SASS micro-data files contain an "urbanicity" code (Locale) developed by Johnson (1989). This code is believed to be a more accurate description of the community than the self-reports on SASS. This methodology assigns "type of locale codes" based on the school mailing address matched to Bureau of the Census data files containing population density data, Standard Metropolitan Statistical Area (SMSA) codes, and a Census code defining urban and rural areas.

This rigorously defined locale code on the 1990-91 and 1993-94 SASS files may be different from the self-report of community type.

[4] See Gruber, K., Rohr, C., and Fondelier, S. (1993) for a crosswalk of the changes between the 1988 and 1991 questionnaires.

[5] See Royce, D. (1992).

2 . Defining the Universe for the 1993-94 SASS: Scope of 1993-94 SASS

In the 1993-94 SASS, the 1991-92 Common Core of Data (CCD) was used as a sampling frame for public schools. The 1991-92 PSS, updated with 1992-93 association lists, was used as a sampling frame for private schools. The following terms define the scope of the components of the 1993-94 SASS. The CCD and the PSS are described further in Appendix 1.

2.1 Teacher Demand and Shortage Survey

Local Education Agency (LEA). An LEA, or public school district, is defined by CCD as a government agency administratively responsible for providing public elementary and/or secondary instruction and educational support services. The agency or administrative unit must operate under a public board of education. Districts which do not operate schools but do hire teachers are included.

Out-of-Scope. An LEA was considered out-of-scope for the Teacher Demand and Shortage Survey if it did not employ elementary or secondary teachers of any kind, including special education teachers and itinerant teachers.

2.2 School Survey

Public School. The CCD defines a public school as an institution which provides educational services, has one or more teachers to give instruction, is located in one or more buildings, receives public funds as primary support, has an assigned administrator, and is operated by an education agency. Prison schools and schools operated by Department of the Defense (DOD) are included in the definition of a public school for SASS, but DOD schools are not included on CCD so are generally not eligible for interview in SASS.

Out-of-Scope. A public CCD school was considered out-of-scope for SASS if it did not have any students in any grades 1-12 or equivalent ungraded. Schools offering only kindergarten and pre-kindergarten were deleted from the sampling frame before the sample was selected. If a school was determined to be out-of-scope after editing its questionnaire, it was deleted from the data file.

Private School. A private school is defined by the Private School Survey (PSS) as a school not in the public system that provides instruction for any of grades 1-12 where the instruction was not given exclusively in a private home.

Out-of-Scope. A private school was considered out-of-scope for SASS if it did not have any students in any of grades 1-12, if it operated in a private home that was used as a family residence, or if it was undetermined whether it operated in a private home and its size was very small (enrollment less than 10 or only one teacher). Out-of-scope schools were deleted from the sampling frame before the sample was selected. If a school was determined to be out-of-scope after editing its questionnaire, it was deleted from the data file.

BIA School. A BIA school is defined as an educational or residential center operated by or under contract with the Bureau of Indian Affairs offering services to Indian students under the authority of a local school board and the direction of a local school supervisor. The school can occupy one or more buildings and may be day schools, boarding schools, previously private schools, cooperative schools, contract schools, and dormitories.

Out-of-Scope. A BIA school was considered out-of-scope for SASS if it did not have any students in any of grades 1-12. Schools offering only kindergarten and prekindergarten were deleted from the sampling frame before the sample was selected. If a school was determined to be out-of-scope after editing its questionnaire, it was deleted from the data file.

2.3 School Administrator Survey

Administrator. A school administrator questionnaire was sent to the person who is primarily responsible for overseeing the administrative operations and actions of the school.

Out-of-Scope. A school administrator sample case was considered out-of-scope if the school did not have an administrator. Also, if a sample administrator's school was considered out-of-scope, the administrator was automatically classified as out-of-scope.

2.4 Teacher Survey

Teacher. A teacher is defined as any full-time or part-time teacher who teaches in any of grades K-12. Itinerant teachers are included, as well as long-term substitutes who fill the role of a regular teacher on an indefinite basis. An itinerant teacher is defined as a teacher who teaches at more than one school. Beginning in 1993-94, anyone in the school who teaches grades K-12, but whose primary assignment is something else is also defined to be a teacher.

Out-of-Scope. A sample teacher was considered out-of-scope if he/she was a short-term substitute, a student teacher, a nonteaching specialist (e.g., guidance counselor, librarian, nurse, psychologist), an administrator (e.g., principal, assistant principal), a teacher's aide, or in some other professional or support staff position (cooks, custodian, bus driver, dietician, secretary). If a sample school was out-of-scope, all teachers from that school were also considered out-of-scope.

If an LEA was classified as out-of-scope, its teachers, administrators and schools were also classified as out-of-scope. Likewise if a school was classified as out-of-scope, its teachers and administrators were also considered out-of-scope.

2.5 Library Media Center Survey

Library. A library media center is defined as an organized collection of printed and/or audiovisual and/or computer resources which (a) is administered as a unit, (b) is located in a designated place or places, (c) makes resources and services available to students, teachers, and administrators. This definition, not the name, is important; it could be called a library, media center, resource center, information center, instructional materials center, learning resource center, or some other name.

Out-of-Scope. A library media center sample case was considered out-of-scope if the school did not have a library. Also, if the sample library's school was considered out-of-scope, the library was also classified as out-of-scope.

2.6 Library Media Specialist Survey

Librarian. A library media specialist questionnaire was sent to the person who is responsible for the school's library media center. Library media specialists are sometimes referred to as librarians.

Out-of-Scope. A library media specialist sample case was considered out-of-scope if the school's library did not have a librarian or if the librarian was not a staff member whose primary assignment was to perform the duties of a library media specialist. This excluded teachers, volunteers, and other staff members.

2.7 Student Records Survey

Student. A student records questionnaire was sent to the school administrator or another contact at the sample school for each sample student selected for the survey.

Out-of-Scope. A student was considered out-of-scope if he/she dropped out, transferred to another school, withdrew, was expelled, was chronically truant, or died.

3. School, Library, and Teacher Allocation

This section discusses the allocation of the public and private school sample, as well as the library and teacher samples. The Common Core of Data (CCD) file was used as the public school frame. The private school sample was based on the list and area frame design from the Private School Survey (PSS). See the sections noted below for more information concerning the SASS frames and selection procedures. See Appendix 1 for further description of CCD and PSS.

3.1 Public School Allocation (See section 5.1)

3.1.1 SASS Public School Sample Goals

The goals for the public school sample of the 1993-94 SASS were:

1. use the 1991-92 Common Core of Data (CCD) file as a frame.
2. produce state estimates of public school characteristics
3. produce state/elementary and state/secondary estimates of the number of schools
4. produce national estimates of combined schools,
5. produce overall national estimates by various geographic and school characteristics,
6. overlap a certain percentage of the 1993-94 SASS school sample with the 1990-91 school sample to improve 1990-91 to 1993-94 estimates of change over what they would be without overlap, and
7. oversample schools with greater than 19.5% Native American enrollment, so that national estimates can be produced.

3.1.2 Allocation Methodology

The 1993-94 SASS sample was allocated so that state level elementary and secondary estimates could be made for public schools.

The approach for the allocation was done according to the following priority:

1. Use a total public school sample size in the 1993-94 SASS of 9,333.
2. Allocate 1,300 schools proportional to the 1990-91 SASS unit standard errors for the state/combined school strata to achieve maximum precision for national combined school estimates. The maximum precision refers to an optimum allocation to estimate total teachers.
3. Allocate the remainder of the school sample proportional to the 1990-91 SASS unit standard errors for the state/elementary and state/secondary school strata.
4. Assign a minimum number of schools to each stratum (state/level). For the combined school strata, the minimum was 10. For elementary/secondary strata the school minimum was 80. (With eighty schools in a stratum most elementary/secondary stratum coefficients of variation should be 15% or less.)
5. Control the state collection burden. No stratum should have a sample size larger than 40% of the total number of schools in the stratum.

The allocation process described above could be done using any SASS variable. Total teachers, total enrollment and total number of schools were used to do separate allocations. Because the primary objective in SASS is to estimate teacher characteristics and because the allocations based on enrollment and school estimates produced similar allocations to the one based on teacher estimates, the teacher allocation was used as the final allocation.

3.1.3 Allocation Results

Table 3 provides the final stratum allocation of the 1993-94 SASS public school sample. Table 4 gives the percentage of total schools by state in the public school sampling frame that were selected for sample. Table 5 summarizes the percentages by grade level. These tables exclude schools with high Native American enrollment. See section 3.1.4. for further explanation.

Table 3.--Public School Stratum Sample Sizes by State and School Level in 1993-94 SASS

State	Combined[1]	Elementary	Secondary	Total
Total United States	1,335	4,152	3,846	9,333
Alabama	61	80	80	221
Alaska	83	77	36	196
Arizona	10	80	80	170
Arkansas	4	80	80	164
California	104	125	187	416
Colorado	13	80	80	173
Connecticut	10	80	80	170
Delaware	7	46	19	72
District of Columbia	7	47	18	72
Florida	98	80	80	258
Georgia	19	80	80	179
Hawaii	4	72	18	94
Idaho	8	80	78	166
Illinois	75	128	80	283
Indiana	24	80	80	184
Iowa	9	80	80	169
Kansas	1	80	80	161
Kentucky	7	80	80	167
Louisiana	65	80	80	225
Maine	7	80	65	152
Maryland	11	80	80	171
Massachusetts	6	80	143	229
Michigan	67	80	80	227
Minnesota	11	80	80	171
Mississippi	39	80	80	199
Missouri	18	80	80	178
Montana	1	80	80	161

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Table 3.--Public School Stratum Sample Sizes by State and School Level in 1993-94 SASS (Continued)

State	Combined[1]	Elementary	Secondary	Total
Nebraska	10	80	80	170
Nevada	5	80	34	119
New Hampshire	1	80	39	120
New Jersey	34	80	80	194
New Mexico	6	80	56	142
New York	98	80	135	313
North Carolina	24	80	80	184
North Dakota	2	80	80	162
Ohio	36	80	80	196
Oklahoma	1	80	80	161
Oregon	10	80	80	170
Pennsylvania	36	80	80	196
Rhode Island	2	80	24	106
South Carolina	4	80	80	164
South Dakota	4	80	80	164
Tennessee	29	80	80	189
Texas	153	137	123	413
Utah	10	80	80	170
Vermont	7	80	21	108
Virginia	28	80	80	188
Washington	37	80	80	197
West Virginia	18	80	80	178
Wisconsin	10	80	80	170
Wyoming	1	80	50	131

[1] The sample size allocated to combined schools is not sufficient to make reliable state estimates.
Source: 1993-94 SASS: Public school sample file.

Table 4.--Proportion of Public School Frame Selected in 1993-94 SASS Sample by State

State	Sample Size	Percent of Frame in Sample
Total United States	9,333	11.5%
Alabama	221	17.6%
Alaska	196	40.0%
Arizona	170	17.5%
Arkansas	164	15.0%
California	416	5.5%
Colorado	173	12.9%
Connecticut	170	17.4%
Delaware	72	41.9%
District of Columbia	72	40.4%
Florida	258	10.5%
Georgia	179	10.4%
Hawaii	94	39.8%
Idaho	166	28.7%
Illinois	283	6.9%
Indiana	184	9.7%
Iowa	169	10.9%
Kansas	161	11.1%
Kentucky	167	12.1%
Louisiana	225	15.6%
Maine	152	20.9%
Maryland	171	14.3%
Massachusetts	229	13.2%
Michigan	227	7.0%
Minnesota	171	11.0%
Mississippi	199	20.8%
Missouri	178	8.6%

Table 4.--Proportion of Public School Frame Selected in 1993-94 SASS Sample by State* (Continued)

State	Sample Size	Percent of Frame in Sample
Montana	161	20.3%
Nebraska	170	11.8%
Nevada	119	33.1%
New Hampshire	120	30.0%
New Jersey	194	8.6%
New Mexico	142	24.6%
New York	313	8.0%
North Carolina	184	9.7%
North Dakota	162	28.6%
Ohio	196	5.2%
Oklahoma	161	12.4%
Oregon	170	14.4%
Pennsylvania	196	6.1%
Rhode Island	106	34.5%
South Carolina	164	15.0%
South Dakota	164	26.4%
Tennessee	189	12.5%
Texas	413	6.9%
Utah	170	24.7%
Vermont	108	32.1%
Virginia	188	10.4%
Washington	197	11.0%
West Virginia	178	18.4%
Wisconsin	170	8.6%
Wyoming	131	32.4%

Source: 1993-94 SASS: Public school sample file.

Table 5.--Proportion of Public School Frame Selected in 1993-94 SASS Sample by School Level

School Level	Sample Size	Percent of Frame in Sample
Total	9,333	11.3%
Combined	1,335	32.1%
Elementary	4,152	7.4%
Secondary	3,846	17.6%

Source: 1993-94 SASS: Public school sample file.

3.1.4 Oversampling of Schools with More Than 19.5% Native American Enrollment

To improve Native American school estimates, schools with American Indian/Aleut/Eskimo student populations greater than or equal to 19.5% (Native American strata) were placed into their own strata. Arizona, California, Montana, New Mexico, North Dakota, Oklahoma and Washington had individual Native American strata. The rest of the states were placed into an "all other states" Native American stratum. Schools in the Native American strata were also stratified by school level. These strata were allocated 450 schools proportional to the sum of the square root of teachers for the schools in the stratum. An additional requirement was that the elementary and secondary strata each have at least 150 schools. The sample sizes are provided in Table 6. Since most Alaskan schools have at least 19.5% Native American students, they were not included in this stratification, but they are included in the analytic estimates.

Table 6.--American Indian/Aleut/Eskimo Stratum Sample Sizes by State and School Level in 1993-94 SASS

State	Total	Elementary	Secondary	Combined
Total	451	268	151	32
Arizona	35	22	11	2
California	20	9	7	4
Montana	36	21	15	-
New Mexico	33	23	10	-
North Dakota	12	6	6	-
Oklahoma	176	111	65	-
Washington	20	8	4	8
All Others	119	68	33	18

Note: "_" means there were no schools on the frame.
Source: 1993-94 SASS: Public school sample file.

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3.1.5 Selection of Bureau of Indian Affairs (BIA) Schools

The universe of BIA schools was obtained from a 1992-93 list of 176 schools provided by the Bureau of Indian Affairs. The BIA schools were selected from the universe of BIA schools since not all the BIA schools were listed on the CCD.

3.1.6 General Remarks

The allocated sample size often differed from the actual number of sample cases selected. The reason for this is because the school's probability of selection was conditioned on the 1991 sample instead of its unconditional probability of selection when sampled. This was done in order to achieve the target percent overlap.

This introduces an element of randomness into the actual sample size selected. See Appendix 2 for further discussion of this issue.

3.2 Private School Allocation for the List Frame Sample (See section 5.3)

The goals for the 1994 SASS private school allocation for the most part remained the same as the 1991 goals.

1. Produce detailed Private School Association group estimates.
2. Produce national private sector estimates.
3. Produce national private sector school level estimates.
4. Produce estimates for national public vs private sector comparisons.

The 1994 goals included one slight modification from the 1991 goals. One additional private school association was added in 1994 as a stratum, the National Independent Private School Association.

The allocation procedure used for the 1994 SASS was almost the same as that used for the 1991 SASS. The file was stratified by association/level/region.

In addition to the list frame, an area search frame was produced to correct for coverage deficiencies in the list frame. The private school sample size selected from the list frame was intended to be 3,202 schools. In addition, 158 schools were selected from the area frame. The list frame represents 24,767 of 26,093 total private schools (95%). The area frame represents 1326 of 26,093 total private schools (5%). See section 5.3.3 for more detailed discussion of the Private School Area Frame.

Table 7 provides the allocation for the list frame. The table includes allocations for the association/level/region strata, as well as for marginal aggregate groupings. Table 8 shows the allocation by association/level, as well as the marginal aggregate groupings. Table 9 gives the proportion of list frame schools selected for sample by association; Table 10 gives the proportion by grade level; Table 11 gives the proportion by region.

Region here refers to Census regions, and is defined by:

a. Northeast consists of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

b. Midwest consists of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

c. South consists of Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

d. West consists of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

Table 7.--Allocated Private School Stratum Sample Sizes by Association, Region and School Level in 1993-94 SASS

	North East (1)				Midwest (2)			
Association	Elementary	Secondary	Combined	Total	Elementary	Secondary	Combined	Total
Total	407	201	296	904	519	172	181	872
Catholic	187	96	13	296	222	104	15	341
Friends	18	3	23	44	6	2	2	10
Episcopal	7	9	4	20	2	0	3	5
National Hebrew Day	44	33	7	84	10	2	2	14
Solomon Schechter	27	1	4	32	6	1	1	8
Other Jewish	23	9	15	47	6	4	4	14
Lutheran - Missouri Synod	2	1	2	5	53	6	2	61
Lutheran - Wisconsin Synod	1	0	0	1	71	11	2	84
Evangelical Lutheran Church in America	16	0	2	18	27	1	2	30
Other Lutheran	4	0	1	5	28	2	9	39
Seventh Day Adventist	10	3	8	21	10	4	10	24
Christian Schools International	4	2	11	17	20	12	22	54
American Association of Christian Schools	10	0	10	20	10	2	10	22
National Association of Private Schools for Exceptional Children	2	1	64	67	1	0	21	22
Military	0	2	1	3	1	4	2	7
Montessori	16	0	2	18	18	0	6	24
National Association of Independent Schools	14	26	65	105	10	7	20	37
National Independent Private School Association	8	3	15	26	2	0	2	4
Other	14	12	49	75	16	10	46	72

Table 7.--Allocated Private School Stratum Sample Sizes by Association, Region and School Level in 1993-94 SASS (Continued)

	South				West			
Association	Elementary	Secondary	Combined	Total	Elementary	Secondary	Combined	Total
Total	336	119	411	866	292	95	173	560
Catholic	103	52	18	173	68	42	10	120
Friends	7	1	9	17	8	1	5	14
Episcopal	25	9	21	55	11	2	7	20
National Hebrew Day	7	4	6	17	2	2	2	6
Solomon Schechter	11	1	0	12	5	0	0	5
Other Jewish	9	4	10	23	11	2	3	16
Lutheran - Missouri Synod	13	2	2	17	13	2	2	17
Lutheran - Wisconsin Synod	2	0	1	3	7	3	1	11
Evangelical Lutheran Church in America	14	0	2	16	34	2	0	36
Other Lutheran	3	0	0	3	11	0	2	13
Seventh Day Adventist	10	8	10	28	10	9	10	29
Christian Schools International	10	2	25	37	7	3	15	25
American Association of Christian Schools	10	2	40	52	8	1	10	19
National Association of Private Schools for Exceptional Children	0	5	56	61	2	0	25	27
Military	6	7	7	20	0	3	0	3
Montessori	27	0	5	32	24	1	2	27
National Association of Independent Schools	10	10	68	88	12	10	17	39
National Independent Private School Association	16	2	16	34	24	2	10	36
Other	53	10	115	178	35	10	52	97

Source: 1993-94 SASS: Private school sample file.

Table 8.--Allocated Private School Sample Sizes by Association and School Level in 1993-94 SASS

Association	Elementary	Secondary	Combined	Total
Total	1554	587	1061	3202
Catholic	580	294	56	930
Friends	39	7	39	85
Episcopal	45	20	35	100
National Hebrew Day	63	41	17	121
Solomon Schechter	49	3	5	57
Other Jewish	49	19	32	100
Lutheran - Missouri Synod	81	11	8	100
Lutheran - Wisconsin Synod	81	14	4	99
Evangelical Lutheran Church in America	91	3	6	100
Other Lutheran	46	2	12	60
Seventh Day Adventist	40	24	38	102
Christian Schools International	41	19	73	133
American Association of Christian Schools	38	5	70	113
National Association of Private Schools for Exceptional Children	5	6	166	177
Military	7	16	10	33
Montessori	85	1	15	101
National Association of Independent Schools	46	53	170	269
National Independent Private School Association	50	7	43	100
Other	118	42	262	422

Source: 1993-94 SASS: Private school sample file.

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Table 9.--Proportion of Private School Frame Selected in 1993-94 SASS Sample by Association

Association	Sample Size	Percent of Frame in Sample
Total	3202	12.8%
Catholic	930	10.7%
Friends	85	100.0%
Episcopal	100	27.4%
National Hebrew Day	121	46.9%
Solomon Schechter	57	100.0%
Other Jewish	100	24.4%
Lutheran - Missouri Synod	100	9.1%
Lutheran - Wisconsin Synod	99	25.6%
Evangelical Lutheran Church in America	100	84.0%
Other Lutheran	60	100.0%
Seventh Day Adventist	102	9.1%
Christian Schools International	133	13.7%
American Association of Christian Schools	113	11.6%
National Association of Private Schools for Exceptional Children	177	63.0%
Military-	33	100.0%
Montessori	101	15.0%
National Association of Independent Schools	269	30.0%
National Independent Private School Association	100	88.5%
Other	422	5.0%

Source: 1993-94 SASS: Private school sample file.

Table 10.--Proportion of Private School Frame Selected in 1993-94 SASS Sample by School Level

School Level	Sample Size	Percent of Frame in Sample
Total	3202	12.8%
Combined	1061	13.0%
Elementary	1554	10.5%
Secondary	587	28.2%

Source: 1993-94 SASS: Private school sample file.

Table 11.--Proportion of Private School Frame Selected in 1993-94 SASS Sample by Census Region

Census Region	Sample Size	Percent of Frame in Sample
Total	3202	12.8%
Northeast	904	14.4%
Midwest	872	12.4%
South	866	13.0%
West	560	11.0%

Source: 1993-94 SASS: Private school sample file.

3.3 Private School Allocation for the Area Frame Sample (See section 5.3)

The area frame is designed to represent the private schools missing from the list frame. A search for schools missing from the list frame is made within 123 selected counties (area frame). A total of 355 schools were found in these area frame sample counties of this total, 158 schools were found in counties not selected with certainty. They were all included in sample as part of the area frame. The remaining 197 schools were in counties selected with certainty, and so could be combined with the list frame before sampling.

3.4 Teacher Allocation (See section 7)

The public and private teacher sample was allocated among the following five strata: 1) American Indian, Aleut or Eskimo; 2) Asian or Pacific Islander; 3) Bilingual/ESL; 4) New; and 5) Experienced. The total teacher allocation was approximately 67,000. The approximate allocation was 1,500 Asian or Pacific Islander teachers, 1,500 American Indian, Aleut, or Eskimo teachers, and 2,000 Bilingual teachers. The remaining 62,000 sample teachers were allocated among new and experienced teachers. If a teacher belonged to more than one stratum, for example Asian bilingual, he or she was categorized into the first stratum they belonged to. In this example, that would be Asian.

For new/experienced teachers in public schools, oversampling was not required due to the large number of sample schools with new teachers. Therefore, teachers were allocated to the new and experienced categories proportional to their numbers

in the school. However, for private teachers, new teachers were oversampled to ensure that there would be enough new teachers in both 1993-94 SASS and the 1994-95 Teacher Follow-up Survey (TFS).[6]

Before teachers were allocated to the new/experienced strata, schools were first allocated an overall number of teachers to be selected. This overall sample size was chosen so as to equalize the teacher weights within school stratum (state/level for public schools, association/level/region for private schools). Teacher weights within stratum were not always equalized, however, due to the differential sampling for Asian Pacific Islander (API), American Indian, Aleut and Eskimo (AIAE), and Bilingual teachers.

Table 12 provides the average number of new and experienced teachers to be selected within each public and private school by school level. For public schools, these sizes are provided by wave. Teachers were selected in three waves in order to prevent the straggling teacher listing forms from delaying the whole teacher sampling process. At the end of the first wave, due to a higher than expected listing form response rate, the projected total sample size was running higher than expected. To compensate, the average number of sample teachers per school was lowered for subsequent waves of teacher sampling.

[6]For more information about TFS, see Bobbitt, S.A. (1994) and Whitener, S. et al. (1994).

Table 12.--Average expected number of new and experienced teachers selected per school by school level and sector in the 1993-94 SASS

	School Level		
	Elementary	Secondary	Combined
Public and BIA Schools:			
Wave 1	3.64	7.28	5.46
Waves 2 and 3	3.10	6.10	4.60
Private Schools	4.00	5.00	3.00

Given the numbers in Table 12, the new/experienced teacher sample size was chosen to equalize the teacher weights within a school stratum. Since the school sample was selected proportional to the square root of the number of teachers in the school, an equally weighted teacher sample within a school stratum was obtained by selecting t_i new or experienced teachers in school i.

$$t_i = W_i T_i (C/Y)$$

where:

W_i is the school weight for school i (the inverse of the school selection probability).

T_i is the number of new and experienced teachers in school i, as reported on the teacher listing form.

C is the average number of teachers selected per school (See Table 12).

Y is the simple average of the school's weighted measure of size over all schools in the school stratum.

For noncertainty schools, the weighted measure of size equals the school sampling interval times the square root of the number of teachers in the school. The measure of size for public certainty schools is the square root of the 1991-92 CCD number of teachers in the school. The measure of size for private certainty schools is the square root of the 1991-92 PSS number of teachers in the school.

The maximum number of new/experienced teachers per school was set at twice the average number of teachers selected per school from Table 12. At least one teacher was selected in each school.

Given the allocation of teachers, t_i, teachers were allocated to the new/experienced strata, t_{ni} and t_{ei}, respectively, in the following manner.

$$t_{ni} = (A t_{ni} t_i)/(T_{ei} + A T_{ni})$$

and

$$t_{ei} = (T_{ei} t_i)/(T_{ei} + A T_{ni})$$

where:

A is the oversampling factor for new teachers (A = 1.0 for public teachers and A = 1.8 for private teachers).

T_{ni} is the number of new teachers in school i.

T_{ei} is the number of experienced teachers in school i.

The Asian Pacific Islander (API), American Indian, Aleut, Eskimo (AIAE), and Bilingual teachers were allocated in the following manner:

$$t_{pi} = (W_i \ T_{pi})/R$$

$$t_{ai} = (W_i \ T_{ai})/H$$

$$t_{bi} = (W_i \ T_{bi})/Q$$

where:

T_{pi} is the number of API teachers in school i.

T_{ai} is the number of AIAE teachers in school i.

T_{bi} is the number of bilingual teachers in school i.

R is the national sampling interval to ensure that at least 1500 API teachers are selected nationwide (R=15).

H is the national sampling interval to ensure that at least 1500 AIAE teachers are selected nationwide (H=6).

Q is the national sampling interval to ensure that at least 2000 bilingual teachers are selected nationwide (Q=32).

To make sure a school was not overburdened, the maximum number of teachers per school was set at 20. When the number of sample teachers exceeded 20 in a school, the API, AIAE, and bilingual teachers were proportionally reduced to meet the maximum requirement.

Table 13 provides the number of teachers selected from the selection process described above. The designated number of teachers may differ from the actual number selected for the following reasons:

1. Native American, Asian/Pacific Islander and Bilingual/ESL sampling rates were approximations, so the exact sample sizes were also approximations.

2. The within school teacher allocations were determined using school teacher estimates from the frame. To the extent that the actual teacher counts differed from the estimates, the actual number selected might be higher or lower than expected.

Table 13.--Number of Selected Teachers in 1993-94 SASS Sample by Teacher Type and Sector

Teacher Type	Public	Private	Total
Native American	1,525	136	1,661
Asian/Pacific Islander	1,483	252	1,735
Bilingual/ESL	2,024	94	2,118
New	4,799	2,182	6,981
Experienced	46,905	8,884	55,789
Total	56,736	11,548	68,284

Source: 1993-94 SASS: Public and private teacher files.

3.5 Public and BIA School Library Allocation for the Library/Librarian Sample

The goals for the 1993-94 SASS public school library allocation were as defined below:

1. Produce national public school grade level, and urbanicity estimates.

2. Produce state-level public school estimates.

3. Produce national BIA school estimates.

The public school libraries were allocated by the following method:

1. Allocate all BIA schools for the public school library sample.

2. Allocate 5,000 non-BIA schools proportional to the 1993-94 SASS number of schools in a stratum (state/level). Each state had a minimum of 70 schools. The sample sizes for the non-BIA libraries by stratum are given in Table 14.

3.6 Private School Allocation for the Library/Librarian Sample

The goals for the 1993-94 SASS private school library allocation were to produce national private school grade level, urbanicity, and major affiliation (Catholic, other religious, nonsectarian) estimates.

The private school libraries were allocated by the following method:

Allocate 2,500 schools (from both the list frame and area frame) proportional to the number of schools in a stratum (recoded affiliation/grade level/recoded urbanicity). Schools with special program emphasis, special education, vocational, or alternative curriculum were excluded. Recoded urbanicity is defined specifically in section 6.

Table 15 provides the allocation. The table includes allocation for the recoded affiliation/grade level/recoded urbanicity strata, as well as for marginal aggregate groupings. Table 16 shows the allocation by recoded affiliation/grade level, as well as the marginal aggregate groupings.

Table 14.--Public School Library Stratum Sample Sizes for non-BIA schools by State and School Level in 1993-94 SASS

State	Combined	Elementary	Secondary	Total
Total United States	698	2274	2022	4,994
Alabama	34	42	41	117
Alaska	42	39	18	99
Arizona	6	52	45	103
Arkansas	2	40	39	81
California	53	64	96	213
Colorado	8	40	41	89
Connecticut	4	39	39	82
Delaware	7	47	18	72
District of Columbia	6	47	18	71
Florida	49	39	40	128
Georgia	10	39	40	89
Hawaii	4	54	13	71
Idaho	5	40	40	85
Illinois	37	62	40	139
Indiana	13	39	40	92
Iowa	4	39	40	83
Kansas	1	40	40	81
Kentucky	3	39	40	82
Louisiana	32	40	38	110
Maine	4	39	33	76
Maryland	5	39	40	84
Massachusetts	3	39	70	112
Michigan	36	42	41	119
Minnesota	6	43	42	91
Mississippi	20	40	40	100
Missouri	9	40	39	88
Montana	1	49	45	95

Table 14.--Public School Library Stratum Sample Sizes for non BIA schools by State and School Level in 1993-94 SASS (Continued)

State	Combined	Elementary	Secondary	Total
Nebraska	5	41	39	85
Nevada	5	46	21	72
New Hampshire	1	46	23	70
New Jersey	16	40	40	96
New Mexico	4	50	34	88
New York	48	41	69	158
North Carolina	12	46	43	101
North Dakota	1	43	44	88
Ohio	18	39	40	97
Oklahoma	1	93	70	164
Oregon	5	40	41	86
Pennsylvania	19	39	41	99
Rhode Island	2	54	14	70
South Carolina	2	39	40	81
South Dakota	3	42	42	87
Tennessee	14	38	40	92
Texas	76	67	60	203
Utah	8	41	41	90
Vermont	4	51	15	70
Virginia	14	39	40	93
Washington	22	44	41	107
West Virginia	8	39	40	87
Wisconsin	5	42	40	87
Wyoming	1	42	28	71

Source: 1993-94 SASS: Public school library sample file

Table 15.--Allocated Private Library Stratum Sample Sizes by Recoded Affiliation, School Level, and Recoded Urbanicity

	Urbanicity Recode											
	1: Central City				2: Balance of MSA				3: Outside MSA			
Recoded Affiliation	**Elem.**	**Sec.**	**Comb.**	**TOTAL**	**Elem.**	**Sec.**	**Comb.**	**TOTAL**	**Elem.**	**Sec.**	**Comb.**	**TOTAL**
TOTAL	593	238	281	1,112	473	162	229	864	271	90	163	524
Catholic	227	141	15	383	164	82	11	257	100	29	13	142
Other Religious	270	72	170	512	227	56	138	421	143	38	106	287
Non-sectarian	96	25	96	217	82	24	80	186	28	23	44	95

Source: 1993-94 SASS: Private school library sample file.

Table 16.--Allocated Private Library Sample Sizes by Recoded Affiliation and School Level

Recoded Affiliation	Elementary	Secondary	Combined	TOTAL
TOTAL	1,337	490	673	2,500
Catholic	491	252	39	782
Other Religious	640	166	414	1,220
Nonsectarian	206	72	220	498

Source: 1993-94 SASS: Private school library sample file.

3.7 Allocation for the Student Sample

3.7.1 SASS Student Sample Goals

Target student sample sizes were chosen so as to meet the following goals. School allocations were chosen with the assumption that an average of two teachers and four students would be chosen per sample school. This differs from the target of three due to school nonresponse and small schools with less than three SASS sample teachers.

1. The public sample was designed to make national estimates by school level or urbanicity. Regional estimates were also desired.

2. The Native American sample was designed to make national estimates with comparable precision as for other public schools, as described in goal 1.

3. The private sample was designed to make national estimates by school grade level or major affiliation (Catholic, other religious, nonsectarian).

3.7.2 Allocation Methodology

The Student Sample was allocated by the following method:

1. 1,370 public schools were subsampled from the SASS Public school sample. All SASS sample Native American, BIA and Alaskan schools were selected. See Table 17a for the sample sizes by Type of School.

2. Regular public schools were stratified by grade level and urbanicity. A total sample size of 551 was allocated proportional to the number of SASS public schools in each stratum. See Table 17b for the sample sizes by stratum.

3. Private schools were stratified by affiliation and grade level. A total of 379 was allocated to each stratum proportional to the number of SASS schools in each stratum. See Table 18 for the sample sizes by stratum.

4. If possible, three SASS sample teachers were selected from each SASS Student subsampled school. If a school had less than three sample teachers, all sample teachers were selected.

5. Two sample students were selected from each selected teacher. See section 8 for further discussion of the student sampling.

Table 17a.--School Sample sizes for the Public School Student Subsample by Type of School in 1993-94 SASS

Type of School	
Total	1,370
American Indian	444
BIA	176
Alaska	199
Regular public	551

Source: 1993-94 SASS: Public student sample file.

Table 17b.--School Sample Sizes for the Regular Public School Student Subsample by Grade Level and Urbanicity in 1993-94 SASS

		Grade Level			
	Urbanicity	Elem.	Sec.	Comb.	Total
Regular Public:	Central City	66	53	24	143
	Suburb	56	52	15	123
	Rural	123	124	38	285
	Total	245	229	77	551

Source: 1993-94 SASS: Public student sample file.

Table 18.--School Sample Sizes for the Private School Student Subsample by Affiliation and Grade Level in 1993-94 SASS

Affiliation	Elementary	Secondary	Combined	Total
Catholic	67	34	10	111
Other religious	87	22	64	173
Nonsectarian	28	10	57	95
Total	182	66	131	379

Source: 1993-94 SASS: Private student sample file.

4. Overlapping the 1991 and 1994 SASS School Samples

4.1 Public Schools

One of the goals for the 1993-94 SASS was to measure change between 1991 and 1994 for various characteristics. To improve such estimates, the sample selection process controlled the amount of overlap between the 1991 and 1994 school samples. Appendix 2 describes how this was done.

For 1993-94 SASS, the amount of overlap was set at 30%. The 1993-94 SASS overlap rate was kept the same as the 1990-91 SASS overlap rate. The 1991 SASS controlled the amount of overlap between the 1987-88 and 1990-91 SASS school samples. The 30% rate used for 1990-91 SASS was based on the results of the 1990-91 SASS pretest survey.

The following provides the 1990-91 SASS pretest survey results for schools and LEAs:

The 1990-91 SASS pretest measured the impact of collecting data from the same school several times. For public schools, the effect on response rates was minimal - 92% for nonoverlap schools and 87% for overlap schools. (To account for overlap schools being selected only from 1987-88 SASS respondents, overlap pretest sample schools were adjusted for the 1987-88 SASS nonresponse.) Similar rates computed for the 1993-94 SASS, show there was no effect on response rate - 92.1% for nonoverlap schools and 91.8% for overlap schools. This suggests that the school overlap rate can be high, since the increased precision resulting for estimates of change produces little, if any, degradation of response rates.

Increased overlap for schools implies increased overlap for LEAs. The 1991 LEA pretest response rates were 95% for nonoverlap LEAs and significantly less (84%) for overlap LEAs. This seems to indicate some reluctance on the part of the LEAs to participate multiple times.

An estimate for the number of LEAs that would be overlapped from independent samples was 47% (obtained by summing the 1988 selection probabilities for 1988 sampled LEAs). This implies a sizable LEA overlap even if the school overlap isn't increased; thus some reduction in LEA response rates was expected in the 1991 SASS, maybe 5 percentage points. Any control to increase the school overlap would increase the LEA overlap rate and likely reduce the overall LEA response rates even more.

To minimize the impact on the 1991 LEA response rates, the school overlap was set at 30%. With a controlled 30% school overlap, the expected LEA overlap rate was 58%, which from the 1991 SASS pretest translates into an expected 6 percentage point drop in response rates if there were no overlap at all. The predicted drop in the LEA response rate did not occur. The simplification in the 1990-91 LEA questionnaire is a contributing factor for the actual increase in response rate.

4.2 Private Schools

From the 1991 SASS pretest, we learned that overlapping samples reduces response rates among private schools. It is important to minimize the impact overlapping samples will have on the response rate. To do this, we designed a sampling scheme which controlled the expected overlap. This sampling scheme, used in the list frame, provided a 30% overlap for associations with a high response rate and minimized the overlap for associations with a low response rate. The response rates for each association in 1991 were similar to those in 1988. The overlap for 1994 was expected to remain the same as in 1991.

Table 19 shows the expected overlap for each association for the list frame.

Note the 1993-94 SASS data do not support our assumptions about the effect of overlapping sample upon the response rate. The response rate for nonoverlap was actually slightly lower than overlap (82.8% versus 87.9%) for 1993-94 SASS private schools.

Table 20 shows the expected and actual overlap sample sizes for each private school affiliation in the list frame.

Table 19.--1990-91 SASS Response Rates and Expected Overlap in Percent for Associations in the 1993-94 SASS List Frame

Association	1991 Response Rate (%) (using unweighted data)	Expected Overlap (%)
Catholic	90.2	30
Friends	90.6	100[1]
Episcopal	85.0	15-20
National Hebrew Day	73.0	minimize overlap
Solomon Schechter	85.1	100[1]
Other Jewish	63.7	minimize overlap
Lutheran - Missouri Synod	95.7	30
Lutheran - Wisconsin Synod	97.9	30
Evangelical Lutheran Church in America	95.5	100[1]
Other Lutheran	93.4	30
Seventh Day Adventist	94.9	30
Christian Schools International	91.0	30
American Association of Christian Schools	70.0	minimize overlap
National Association of Private Schools for Exceptional Children	88.0	20-25
Military	90.9	100[1]
Montessori	85.6	minimize overlap
National Association of Independent Schools	94.5	minimize overlap
National Independent Private School Association[2]	----	-----
Other	82.7	minimize overlap

[1] The overlap is 100% because all schools in the association are in the sample.
[2] This is a new group. There is no expected overlap, since this was not a separate stratum in 1991.
Source: 1993-94 SASS: Private school data file.

Table 20.--Private School Expected and Actual Overlap Sample Sizes for Associations in the List Frame for 1993-94 SASS

Association	Expected Overlap Sample Size	Actual Overlap Sample Size
Catholic	279	267
Friends	59	59
Episcopal	34	34
National Hebrew Day	29	26
Solomon Schechter	40	40
Other Jewish	19	16
Lutheran - Missouri Synod	30	28
Lutheran - Wisconsin Synod	30	36
Evangelical Lutheran Church in America	81	81
Other Lutheran	18	19
Seventh Day Adventist	31	31
Christian Schools International	40	32
American Association of Christian Schools	0	0
National Association of Private Schools for Exceptional Children	40	38
Military	18	18
Montessori	21	19
National Association of Independent Schools	22	39
National Independent Private School Association[1]	0	9
Other	3	3
TOTAL	794	795

Notes: The 1993-94 SASS private school sample file was unduplicated as a result of list updating operations for 1993-94 PSS.
[1] Was not an Association for 1990-91 SASS.
Source: 1993-94 SASS: Private school sample file.

5. Public School, Private School, and LEA Sample Selection

5.1 Public and BIA School Sample

This section describes the frame, stratification, sorting and sample selection.[7] The school allocation is described earlier in the School and Teacher Allocation section (see section 3). In total, 9,956 public schools were selected. This differs from the designated sample size presented in section 3 due to the randomness introduced into the sampling by the overlap sampling described in section 4.

The SASS public school sample was selected so that a maximum of 30% of the schools in the 1991 sample were also in the 1994 sample. See Appendix 2 for a description of that process.

5.1.1 Public School Frame

The primary public school frame for the 1993-94 SASS was the 1991-92 school year Common Core of Data (CCD) file. The CCD is based on survey data collected annually by NCES from all state education agencies. For the 1991-92 school year, state education agencies used their administrative record data to report data for a total of 86,287 schools. NCES and the state education agencies work cooperatively to assure comparability between data elements reported. The CCD is believed to be the most complete public school listing available. The frame includes regular public schools and Department of Defense schools. Nonregular schools such as special education, vocational or technical schools are also included in the sample frame. Before sampling, duplicate schools and schools outside of the United States were removed from the frame. Schools that only teach prekindergarten, kindergarten or adult education were also removed. A total of 82,746 schools remained on the 1991-92 public school frame.

A list of 176 BIA schools was obtained from the Bureau of Indian Affairs. This constituted the other public school sampling frame.

5.1.2 Stratification

The first level of stratification was four types of schools: (A) BIA (Bureau of Indian Affairs) schools; (B) Native American schools (schools with 19.5% or more Native American students); (C) schools in Delaware, Nevada and West Virginia (where it was necessary to implement a different sampling methodology to select at least one school from each LEA in the state - see section 5.2.3); and (D) all other schools (all schools not included in A, B, or C).

The second level of stratification: The type B schools were stratified by Arizona, California, Montana, New Mexico, North Dakota, Oklahoma, Washington, and all other states (except Alaska, since most Alaskan schools have high Native American enrollment). The type C schools were stratified first by state and then by LEA. The type D schools were stratified by state (all states and the District of Columbia except Delaware, Nevada and West Virginia).

Within each second level there were 3 grade level strata (elementary, secondary, and combined schools), defined as follows:

Regular Schools:

Elementary: Lowest grade ≤ 6 and Highest grade ≤ 8

Secondary: Lowest grade ≥ 7 and Highest grade ≤ 12

Combined: Lowest grade ≤ 6 and Highest grade > 8 or all ungraded

Nonregular schools, which include special education, vocational, technical, adult education (if part of an in-scope school) or alternative/continuation grades were classified as combined schools.

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[7] For further discussion of stratified systematic sampling, see Cochran, W. (1977).

5.1.3 School Sorting

To facilitate the calculation of LEA weights, it was important that within a stratum all schools belonging to the same LEA be together. This can be achieved by sorting by LEA ID first. However, to increase the efficiency (reduce the variance) of the school sample design, it was better to sort by other variables before sorting by LEA ID (see below). To achieve both of these goals, the sort variable values for zip code were recoded to make them the same for every school within a stratum/LEA.

All schools within a stratum/LEA had the first three digits of the ZIP code set equal to that of the first school in the stratum/LEA.

After the zip code was recoded, non-BIA schools within a stratum were sorted by these following variables:

1. State;
2. LEA metro Status
   1 - central city of a Metropolitan Statistical Area (MSA)
   2 - MSA, not central city
   3 - outside MSA;
3. Recoded LEA Zip code — The first three digits of the zip code of the first school in the stratum/LEA
4. CCD LEA ID number[8];
5. Highest grade in school;
6. School percent minority (obtained by summing Number of Black non-Hispanic, Hispanic, Asian/Pacific Islander and American Indian/Alaskan students and dividing by total enrollment
   1 - < 5.5% or unknown
   2 - ≥ 5.5% and < 20.5%
   3 - ≥ 20.5 and < 50.5%
   4 - 50.5% or more);
7. School enrollment; and
8. CCD School ID[9].

BIA schools were not sorted since they were in sample with certainty.

5.1.4 Sample Selection

All the BIA schools were selected for the 1993-94 SASS sample. There were 176 BIA schools. See section 3.1.5 for further discussion of BIA Schools.

Within each stratum, all non-BIA schools were systematically selected using a probability proportionate to size algorithm. The measure of size used for the schools on CCD was the square root of the number of teachers in the school as reported on the CCD file. Any school with a measure of size larger than the sampling interval was excluded from the probability sampling operation and included in the sample with certainty. This produced a non-BIA sample of 9,780 for a total 1993-94 SASS sample size of 9,956 (non-BIA and BIA). These represent the actual sample sizes selected, as opposed to the expected sample sizes as presented in section 3.

5.2 LEA Sample

5.2.1 LEAs with Schools

During the initial design development of the SASS, consideration was given to selecting the LEAs first and then selecting schools within LEAs. It was hypothesized that doing this would reduce the reliability of both school and teacher estimates, but might be offset by the improvement in reliability of LEA estimates. Simulations done on the reliability of LEA estimates when the LEAs were selected first confirmed the loss in reliability for school and teacher estimates.[10] The simulations also showed that selecting school "first" would produce only slightly

[8]CCD LEA ID is a unique number assigned to each school district by NCES.

[9]CCD School ID is a unique number assigned to each school.

[10]See Wright, Doug. (1988).

less accurate LEA estimates. For these reasons the SASS sample design selected schools first.

Hence, the LEA sample consists of the set of LEAs that were associated with the SASS public school sample. This provides the linkage between the LEA and the school. Table 21 provides the number of LEAs selected by state. This portion of the LEA sample represented the set of LEAs associated with schools.

5.2.2 LEAs without Schools

Some LEAs were not associated with schools. Such LEAs may hire teachers who teach in schools of other LEAs. For SASS to represent teachers in these LEAs, a sample of these LEAs was also selected. The frame for this sample consisted of all LEAs on the 1991-92 CCD file that were not associated with schools. There were 988 LEAs on this frame. The 337 LEAs that were supervisory unions were excluded from sample. A supervisory union is an organization that oversees one or more LEAs. Thus, they generally do not employ teachers directly and so are not eligible for sample.

A 1 in 6 sample was taken from the remaining 651 LEAs after supervisory unions were excluded. The sample was selected using a systematic equal probability algorithm. The sort variables were:

1. LEA type code from the LEA CCD - variable indicating who operates the LEA (local agency, regional, state, or federal);
2. State;
3. Number of teachers;
4. LEA ID.

Some 109 LEAs were selected and only 5 of the 109 sampled LEAs were actually in-scope (an operating public school agency that reported hiring teachers in SASS). This low rate of eligibility is due to the fact that CCD includes all administrative units on the LEA file, not just those that hire teachers.

5.2.3 Delaware, Nevada and West Virginia LEAs

For each state, a simulation study was done in 1988 to assess the reliability of SASS LEA estimates. The study showed that standard errors from Delaware, Nevada and West Virginia were very high relative to the LEA sampling rate (i.e., coefficients of variation of 5 to 20 percent with 90 percent of LEAs in sample). To reduce the standard error, all LEAs were defined as school sampling strata, placing all LEAs in each of these three states in the LEA sample, and reducing the standard error to zero.

Table 21.--Number of sampled public LEAs by State

State	LEAs	State	LEAs
Total	5,459	Missouri	126
Alabama	103	Montana	155
Alaska	46	Nebraska	116
Arizona	95	Nevada	18
Arkansas	126	New Hampshire	76
California	268	New Jersey	151
Colorado	74	New Mexico	62
Connecticut	100	New York	201
Delaware	19	North Carolina	92
District of Columbia	1	North Dakota	130
Florida	55	Ohio	155
Georgia	97	Oklahoma	235
Hawaii	1	Oregon	107
Idaho	79	Pennsylvania	159
Illinois	193	Rhode Island	35
Indiana	132	South Carolina	70
Iowa	128	South Dakota	112
Kansas	110	Tennessee	86
Kentucky	98	Texas	291
Louisiana	67	Utah	31
Maine	105	Vermont	92
Maryland	23	Virginia	92
Massachusetts	157	Washington	117
Michigan	189	West Virginia	55
Minnesota	134	Wisconsin	126
Mississippi	119	Wyoming	50

Source: 1993-94 SASS: Teacher demand and shortage sample file.

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5.3 Private School Sample

This section describes the frame, stratification, sorting and private school sample selection. The private school allocation is described in the School and Teacher Allocation section (See section 3).

5.3.1 Frames

The 3,347 schools mentioned above include 13 less schools than originally designated. This difference is due to the randomness of the sample sizes introduced by the school overlapping procedures described in section 4.

Affiliation list updating operations for 1994 PSS were completed in time to use the results for 1994 SASS. Thus the 1994 SASS includes a sample of birth records found on various affiliation lists. Also, as part of this operation, duplicates on the existing 1991-92 PSS universe were deleted. A matching operation was run to determine if any of the duplicates were also in sample for SASS. As a result 37 duplicates were deleted from the 1994 SASS Sample, yielding a private school sample size of 3315.

5.3.2 List Frame

The base for the list frame used for private schools was the 1991-92 Private School Survey (PSS) list frame. NCES initiated PSS to build a universe frame of private schools. The 1991-92 PSS list frame universe is based on the 1989-90 PSS universe updated with private school association lists given to the Census Bureau in the spring of 1991. Various private school associations were asked to supply lists of their schools. Twenty-four such lists were received. These lists were matched with the 1989-90 PSS list and any association list school not found on the PSS was added to the frame. Before sampling, duplicate schools were excluded from the frame. Schools that only teach prekindergarten, Kindergarten or adult education were also removed. The list frame consisted of approximately 25,051 schools. The 1991-92 PSS list frame was partially updated for 1993-94 SASS. Again, various private school associations were asked to supply lists of their schools. The same matching procedures were applied and only nonmatches were added to the file.

5.3.3 Area Frame

The United States was divided up into 2054 primary sampling units (PSUs). Each PSU consisted of a single county, independent city or cluster of geographically contiguous counties or independent cities defined so that each PSU had a minimum population of 20,000 according to population projections for 1988, when the PSUs were first formed. To avoid having PSUs covering too large a geographic area some PSUs had less than 20,000 in population. The eight certainty PSUs in 1991 were also excluded from the independent PSU sampling operation.

The 1993-94 SASS area frame was designed to produce approximately 50% overlap with the previous SASS. Consequently, the area frame consisted of two sets of sample Primary Sampling Units (PSUs): 1) a subsample of the 1990-91 SASS area frame sample PSU's (overlap); and 2) sample PSU's selected independently from the 1990-91 SASS sample (nonoverlap). The 1990-91 SASS sample PSUs were selected systematically with probabilities proportional to the square root of 1988 projected population from each of sixteen strata defined by Census region, metro/nonmetro status, and whether the PSU's percent private school enrollment exceeded the median percent private enrollment of the other PSUs in the Census region/metro status strata. By maintaining a fifty percent overlap of PSUs, the reliability of estimates of change was maintained at a reasonable level, while reducing the respondent burden that might be associated with complete overlap.

The eight certainty PSUs in the 1991 SASS area frame remained in the 1993-94 SASS sample with certainty. For 1993-94 SASS, the schools in the 1990-91 certainty area frame PSUs were made a part of the list frame. All 58 of the PSUs that had been in 1991 SASS for the first time and not previously overlapped were selected again for 1993-94 SASS, thus becoming the 1993-94 SASS overlap sample of PSUs.

An additional 58 PSUs were selected independently. The strata were defined the same way as in the 1990-91 SASS area frame design: a) Census region (4 levels - See Section 3.2 for a description), b) metro/nonmetro status (2 levels) and c) whether the PSU's percent private school enrollment exceeded the median percent private enrollment of the other PSU's in the Census region/metro status strata (2 levels - using 1980 Census data).

A minimum of two PSUs were allocated to each of the 16 Strata (32 PSUs). 26 additional PSUs were allocated to the 16 strata to more nearly approximate a uniform sampling fraction of PSUs from each stratum.

The PSUs were selected as a systematic sample with probability proportionate to the square root of the 1988 projected PSU population. The total area frame sample was 124 PSUs, with 123 distinct PSUs in sample since one PSU was selected for both sets of samples. Its weight was adjusted to appropriately reflect the duplication.

The total private school sample size was 3,270 in 1991, 2670 schools from the list frame and 600 schools from the area frame. This was the base for the 1994 sample size. The 3,270 was increased by 45 schools in 1994. A substantial increase occurred in the list frame due to the larger proportionate size of the list frame as compared to the area frame than had occurred in 1991. The 1994 total list frame sample was then 3,162 schools, with 153 schools (after unduplication) for the area sample.

5.3.4 Area Sample Frame Building

Within each of the 123 PSUs, the Census Bureau attempted to find all eligible private schools (i.e., nonpublic schools providing the following: instruction for any grades 1-12, instruction not provided exclusively in the home, and a normal school day at least 4 hours long). An area canvas was not attempted. However, regional field staff created the frame using such sources as: yellow pages, non-Roman Catholic religious institutions, local education agencies, Chamber of Commerce, and local government offices. Roman Catholic religious institutions were not contacted because the National Catholic Education Association provides a very complete list of parochial Catholic schools. Once these lists of schools were constructed, they were matched with the updated list frame school file. Schools that did not match the list were contacted to make sure they were eligible schools. The area frame used for 1993-94 SASS was originally constructed as part of the 1991-92 PSS.

5.3.5 Private School List Frame Sample

5.3.5.1 Stratification

For private schools, the list frame was partitioned into an initial set of 228 cells. The first level of stratification was school association membership (19 groups):

1. Military - membership in the Association of American Military Colleges and Schools;
2. Catholic - affiliation as Catholic or membership in the National Catholic Education Association or the Jesuit Secondary Education Association;
3. Friends - affiliation as Friends or membership in the Friends Council on Education;
4. Episcopal - affiliation as Episcopal or membership in the National Association of Episcopal Schools;
5. Hebrew Day - membership in the National Society for Hebrew Day Schools;
6. Solomon Schechter - membership in the Solomon Schechter Day Schools;
7. Other Jewish - other Jewish affiliation;
8. Missouri Synod - membership in the Lutheran Church, Missouri Synod;

9. Wisconsin Synod - membership in the Evangelical Lutheran Church - Wisconsin Synod or affiliation as Evangelical Lutheran - Wisconsin Synod;

10. Evangelical Lutheran - membership in the Association of Evangelical Lutheran Churches or affiliation as Evangelical Lutheran Church in America;

11. Other Lutheran - other Lutheran affiliation;

12. Seventh-Day Adventist - affiliation as Seventh-Day Adventist or membership in the General Conference of Seventh-Day Adventists;

13. Christian Schools International - membership in Christian Schools International;

14. American Association of Christian Schools - membership in the American Association of Christian Schools;

15. National Association of Private Schools for Exceptional Children - membership in the National Association of Private Schools for Exceptional Children;

16. Montessori - membership in the American Montessori Society or other Montessori associations;

17. National Association of Independent Schools - member of the National Association of Independent Schools;

18. National Independent Private School Association - member of the National Independent Private School Association;

19. All else - member of any other association specified in the PSS or affiliated with a group not listed above or not a member of any association.

Within each association membership, schools were stratified by grade level (elementary, secondary, and combined schools). The definitions are provided below:

Regular Schools:

Elementary: Lowest grade ≤ 6 and Highest grade ≤ 8

Secondary: Lowest grade ≥ 7 and Highest grade ≤ 12

Combined: Lowest grade ≤ 6 and Highest grade > 8, also includes ungraded schools

Nonregular School: Nonregular schools, which include special education, vocational, technical, adult education (if part of in-scope school) or alternative/ continuation grades were classified as combined schools.

Within association/grade level, schools were stratified by four Census regions: Northeast, Midwest, South, and West. For a definition of the four Census Regions, see Section 3.2.

5.3.5.2 School Sorting

Within each stratum, sorting took place on the variables listed below. Sorting serves to improve the efficiency of the overall design.

1. State (51): 1 for each state and the District of Columbia;

2. Highest Grade in the school;

3. Urbanicity: 1 - Large Central City
   2 - Mid-size Central City
   3 - Urban Fringe of Large City
   4 - Urban Fringe of Mid-size City
   5 - Large Town
   6 - Small Town
   7 - Rural

4. Zip code: The first two digits were used;

5. 1991-92 PSS Enrollment;

6. PIN number: The PIN number is a unique number assigned to identify the school on PSS.

5.3.5.3 Sample Selection

Within each stratum, schools were systematically selected using a probability proportionate to size algorithm. The measure of size used was the square root of the 1991-92 PSS number of teachers in the school. Any school with a measure of size larger than the sampling interval was excluded from the probability sampling process and included in the sample with certainty.

5.3.6 Area Frame Sample

As mentioned in section 3.3, 197 area frame schools were found in the 1991-92 PSS area frame within counties that had been selected with certainty. Upon recommendation of NCES, these schools were included as part of the list frame before sampling. Fourteen of these schools were selected for the 1993-94 SASS. All remaining area frame cases, (in the noncertainty PSUs) remained in the area frame and were in sample.

6. Library/Librarian Sample Selection

6.1 Public and BIA School Library/Librarian Sample

This section describes the frame, stratification, sorting and sample selection for public school libraries and librarians. Schools for the library sample were subsampled from the SASS sample schools. The public school library allocation is described in the School and Teacher Allocation section (See section 3). Within a sample library, the librarian questionnaire was given to the head librarian. Thus, within a school, no librarian sampling took place.

6.1.1 Frame

The 1993-94 SASS public school library frame is identical to the frame used for the 1994 SASS public school survey. Refer to section 5.1 for a description of that sample and frame.

6.1.2 Stratification

The BIA schools were placed in a separate stratum.

All the non-BIA schools were stratified by state (51 states including the District of Columbia) and grade level (the 3 grade levels - elementary, secondary and combined) - as defined for public schools in section 5.1.2.

6.1.3 Sorting

The non-BIA schools, were sorted separately within each strata on the following variables listed below. Sorting serves to improve the efficiency of the design.

1. LEA metro status

   1 - central city of a Metropolitan Statistical Area (MSA)
   2 - MSA, not central city
   3 - outside MSA;

2. 1991-92 LEA CCD ID;

3. school enrollment;

4. 1991-92 school CCD ID.

The BIA schools were not sorted since they are selected with certainty.

6.1.4 Sample Selection

All schools in the BIA stratum were selected for sample with certainty.

Within each non-BIA stratum, 1993-94 SASS sample schools were systematically subsampled using a probability proportionate to size algorithm. The measure of size used for the schools was the square root of the number of teachers in the school as reported on the school CCD file times the school's inverse of the probability of selection from the public school sample file. Any school with a measure of size larger than the sampling interval was excluded from the library sampling operation and included in the sample with certainty.

The SASS sample public schools were subsampled to produce the sample for the SASS public school library and librarian surveys. There were 5,170 schools selected for the 1993-94 SASS public school library and librarian surveys. The sample included 176 schools from the BIA stratum and 4,994 schools subsampled from the non-BIA strata.

6.2 Private School Library/librarian Sample

This section describes the frame, stratification, sorting and private library/librarian sample selection. Schools for the library sample were subsampled from the SASS sample schools. The private school allocation is described in the School and Teacher Allocation section (See section 3). Within a sampled library, the librarian questionnaire was given to the head librarian. Thus, within a school, no librarian sampling took place.

6.2.1 Frame

The 1994 SASS private school library frame is identical to the frame used for the 1993-94 SASS private school survey, except that schools with special program emphasis, special education, vocational, or alternative curriculum were excluded. Refer to section 5.3 for a description of the sample and frame for private schools.

6.2.2 Stratification

For private school libraries, the file was partitioned into an initial set of 27 cells. The first level of stratification was recoded affiliation (3 levels):

1. Catholic;
2. Other Religious;
3. Nonsectarian.

Within each recoded affiliation, schools were stratified by grade level (elementary, secondary, and combined schools). The definitions are provided earlier in Section 5.3.5.1.

Within recoded affiliation/grade level, schools were stratified by Recoded Urbanicity. The recoded urbanicity definitions (See Section 5.3.5.2 for Urbanicity definitions) are provided below:

1. Urbanicity = '1' or '2' (urban);
2. Urbanicity = '3' or '4' (suburban);
3. Urbanicity = '5' or '6' or '7' (rural).

6.2.3 Sorting

Within each stratum, sorting took place on the following variables:

1. Frame: list frame
   area frame;
2. School's enrollment.

6.2.4 Sample Selection

Within each stratum, schools were systematically selected using a probability proportionate to size algorithm. The measure of size used was the school's square root of enrollment times the school's inverse of the probability of selection. Any library with a measure of size larger than the sampling interval was excluded from the probability sampling process and included in the sample with certainty.

7. Public and Private Teacher Sample Selection

This section describes the frame, stratification, sorting, and the sample selection for the public and private teacher sample.

Selecting the teacher sample involved the following steps. First, the sample schools were asked to provide teacher lists for their schools. From the teacher lists, 56,736 public school teachers and 11,548 private school teachers were selected.

The public and private school teacher samples will be described together because they were selected using the same methodology. The only differences were in the average number of teachers selected within a school (See section 3.4, table 12).

The details of the teacher selection are provided below.

7.1 Teacher Frame

Each sample school was asked to provide a list of their teachers with the following information for each teacher:

1. ***New/experienced.*** Teachers in their first, second, or third year of teaching are classified as new teachers.

2. ***Race/Ethnicity.*** 1. White (non-Hispanic); 2. Black (non-Hispanic); 3. Hispanic; 4. Asian or Pacific Islander (API); and 5. American Indian, Aleut, or Eskimo (AIAE).

3. ***Bilingual/ESL.*** Teachers who use native language to instruct students with limited English proficiency (bilingual); or teachers providing students with limited English proficiency with intensive instruction in English (English as a Second Language).

4. ***Field of Teaching.*** Elementary teachers were classified as: general elementary, special education or other.

Secondary teachers depending on their primary subject taught were classified as: math, science, English, social studies, vocational education or other.

The above information for all teachers from SASS sample schools comprise the school teacher frame.

Nine percent of the in-scope private schools and five percent of the in-scope public schools did not provide teacher lists. For these schools no teachers were selected. A factor in the teacher weighting is used to adjust the weights to reflect the fact that some schools did not provide teacher lists.

7.2 Teacher Stratification

Within each selected school, teachers were stratified into one of five teacher types in the following hierarchical order:

1. Asian or Pacific Islander (API);
2. American Indian, Aleut, or Eskimo (AIAE);
3. Bilingual/ESL;
4. New (less than 3 years completed in the teaching profession);
5. Experienced (3 or more years completed teaching).

To illustrate the hierarchical ordering, if a teacher was both bilingual and Asian, that teacher would be classified as Asian. A new bilingual teacher would be classified as bilingual.

7.3 Teacher Sorting

The school level file which included the number of teachers at the school for the five teacher strata, was sorted by school strata, school order of selection, and school control number.

7.4 Teacher Selection

Within each school and teacher stratum, teachers were selected systematically with equal probability. Using the teacher probabilities of selection, take every (sampling interval), and start-withs (random start), sample teachers were selected from each stratum

across schools. Target teacher sample sizes per school are listed in Table 12. The within school probabilities of selection were computed so as to give all teachers within a school stratum the same overall probability of selection (self-weighted).

67,044 teachers were designated for selection (approximately 61,173 new and experienced; 1,788 API; 1,757 American Indian, Aleutian, or Eskimo, and 2,326 bilingual/ESL), while 68,284 were actually selected (approximately 6,981 new and 55,789 experienced; 1,735 Asian Pacific Islander; 1,661 American Indian, Aleutian, or Eskimo and 2,118 bilingual/ESL). This slight difference was due to the fact that in allocating the sample, Y, the average of the school's weighted measure of size over all schools in the school stratum, was based on universe files of teacher counts from two years prior (CCD for public, PSS for private) instead of reported teacher counts from the school just prior to data collection. This caused the overall average number of teachers per school to be slightly different than the target numbers in Table 12.

To reduce the variance of teacher estimates, one goal of the teacher selection was to make the teacher sample self-weighting (i.e., equal probabilities of selection). The goal was generally met within teacher stratum within school stratum. However, since the school sample size of teachers was altered due to the minimum constraint (i.e., at least 1 teacher/school) or maximum constraint (i.e., no more than either twice the average stratum allocation or 20 teachers/school), the goal of achieving self-weighting for teachers was lost in some schools.

The Census Bureau estimated the Q, R, and H factors (i.e., sampling intervals for Bilingual, Asian, and Native American strata, mentioned in the Allocation section 3.4.2) conservatively so that there would be more than the designated number of API, AIAE, and bilingual/ESL teachers in sample. After sampling was completed, certain teachers from each of these teachers strata were eliminated from schools with more than 20 teachers per school. The teachers were eliminated at different rates among these strata.

8. Student Sample Selection

This section describes the frame, stratification, sorting and sample selection for the public and private student sample.

Selecting the students involved the following steps. First, a subsample of schools chosen for the school survey were selected for the student survey. Second, approximately three teachers were selected from each of the schools in the student survey sample.

Table 22.--Number of Private, BIA, and Public Schools, Teachers and Students in the Student Survey in 1993-94 SASS

Type of School	Number of schools	Number of teachers	Number of students
Total Private	381	903	1,236
Total Public	1,370	3,748	5,697
BIA	176	430	602
Native American	444	1,262	2,024
Alaska	199	549	759
Other Public	551	1,507	2,312
Total Public and Private	1,751	4,651	6,933

These teachers were subsampled from among the teachers selected for the teacher survey. Finally, approximately two sample students were selected from each sample teacher. From the subsample of 4,651 teachers, 5,697 public and 1,236 private students were selected (see Table 22).

The procedure for selecting the subsample of private and public schools were different and will be explained separately. The method used for selecting teachers and students from private and public schools were the same, and will therefore be explained together.

8.1 Schools

During school sampling, a subsample of 1,370 public and 381 private sample schools were selected for participation in the student survey. The method of selection was designed to minimize the amount of overlap with the library subsample. See Appendix 2 for a discussion of the method of assignment of probabilities.

8.1.1 Subsampling of Public and BIA Schools for the Student Survey

The student survey schools were selected from the 9,956 schools which were selected for the 1993-94 SASS public school sample. For the selection of public student subsample schools, BIA schools, Native American Indians schools, and schools in Alaska were each put into separate certainty strata. All other public schools were stratified by grade level and LEA urbanicity, then sorted by 1993-94 SASS school stratum, census region, SASS order of selection code, and SASS school CCD ID.

Within the noncertainty strata, schools were systematically selected using a probability proportionate to size algorithm. The measure of size used for the schools on the CCD was the square root of the number of teachers in the school as reported on the CCD file times the school's basic weight (the inverse of the school's probability of selection in the school sampling). Any school with a measure of size larger than the sampling interval was excluded from the probability sampling operation and included in sample with certainty.

All SASS sample BIA, Native American, and Alaskan Schools were selected for the student subsample with certainty.

8.1.2 Subsampling of Private Schools for the Student Survey

The student survey private schools were selected from the 3,315 schools on the 1993-94 private school sample file. The private school sample records were stratified by recoded affiliation and grade level, then sorted by frame (list/area) and the school's enrollment.

Within each stratum, schools were systematically selected using a probability proportionate to size algorithm. The measure of size used was the school's square root of enrollment times the school's basic weight (the inverse of the school's probability of selection). Any student survey school with a measure of size larger than the sampling interval was excluded from the probability sampling process and included in the sample with certainty.

8.2 Subsampling of Public, BIA, and Private Teachers for the Student Survey

All sample teachers selected for the SASS teacher survey from schools designated for the student survey also became eligible for the student survey. The file containing SASS sample teachers from private and public schools flagged for the student survey was sorted by school control number (essentially to sort by state), AIAE and all other teacher strata, and teacher subject.[11] Within each school, a subsample of three teachers was selected for the student survey. If a school had less then three sample teachers, all sample teachers from the school were selected.

8.3 Sampling of Public, BIA, and Private Students

The list of 1,751 subsampled schools with approximately three teachers per school was transmitted to the Census Bureau's Data Preparation Division in Jeffersonville, Indiana where two students per teacher were to be selected. The sampling procedures described here were carried out over the telephone through contact with a representative of each sample school. The first step of the student selection procedure in Jeffersonville was to determine teacher eligibility. Teachers that did not teach regularly scheduled classes were considered ineligible and excluded.

Next, eligible teachers were classified as either self-contained or departmental. For teachers classified as self-contained, i.e., the teacher teaches the same group of students most of the day, the staff in Jeffersonville then requested a copy of the class roster. Using the class roster, Jeffersonville selected two sample students per teacher.

For departmental teachers, an additional step, the selection of sample class period, was necessary. A set of five sample class periods (one class period for each of the five days per week) was selected for each school after asking for all possible class periods, in the school, in a week. Next, it was determined which of the five class periods were eligible for each sample teacher, this is if the teacher taught an eligible class that period. Of these eligible periods, one sample class period was selected, at random, for the teacher.

If no eligible class period was found for a teacher in the first five selected for the school, five more class periods were selected, eligible class periods determined, and a sample class period selected. If no eligible periods were identified for a teacher in the second set of five, the school was asked for all of the class periods that the teacher teaches and then one class period was selected at random.

Finally, a copy of the class roster for the sample period and day was requested. Using the class roster, given to Jeffersonville staff, two sample students per teacher were selected systematically for the student survey.

[11]Teacher subject is obtained from the Teacher Listing Form whereby the school is asked to place the teacher in one of ten subject categories: For elementary - general elementary, special education, and other. For secondary - math, science, English, social studies, vocational education, special education, and other.

9. Weighting

This section describes the weighting processes for the different SASS samples. The general purpose of the weighting is to produce estimates from the SASS sample data. That process includes adjustment for nonresponse using respondents' data, and adjustment of the sample totals to the frame totals to reduce sampling variability. For each component of SASS, the formula for the weight will be presented, along with a brief description of each component of the weight. When computations are done within cells, such as nonresponse adjustments, the cells will be described. Sometimes a cell did not have enough data to produce a reliable estimate; in such cases, cells were collapsed. The least important variables were always collapsed first. The collapsing criteria are also described.

First, the school weight will be described. Since the public and private school weights have the same structure, they will be presented together. They differ only in the definition of the cells used to compute the nonresponse adjustment factor and the first-stage ratio adjustment factor, a factor used to adjust for deficiencies in the sample selected from the frame. These cells will be described separately within the school weight section. Since the public and private administrator weights are similar to the school weights, they will be described next. In the fourth section, the public teacher demand and shortage weights will be described. The fifth describes how LEA basic weights were computed. In the sixth weighting section, the teacher weights will be described. Since the public and private school teacher weights have the same structure, they will be presented together. They differ only in the definition of the cells used to compute the various weighting factors. These cells will be described separately within the teacher weight section.

The seventh section describes the public and private school library weighting, while the eighth section describes the public and private school librarian weighting. The final section describes the student weighting.

9.1 School Weight (SASS Questionnaire Forms 3A, 3B, and 3C)

The final weight for the public and private school data is:

(Basic Weight) X (Sampling Adjustment Factor) X (Noninterview Adjustment Factor) X (First-Stage Ratio Adjustment Factor) X (Second-Stage Ratio Adjustment Factor)[12]

Where:

Basic Weight is the inverse of the probability of selection of the school.

Sampling Adjustment Factor is an adjustment that accounts for unusual circumstances that affect the school's probability of selection, such as a merger or duplication (e.g., a junior high school and a senior high school merge to become a junior/senior high school).

Noninterview Adjustment Factor is an adjustment that accounts for total school nonresponse. It is the weighted (basic weight X sampling adjustment factor) ratio of the total eligible in-scope schools to the total responding in-scope schools within cells.

First-Stage Ratio Adjustment Factor is a factor that adjusts the sample estimates to known frame totals. For public schools, it is equal to the ratio of the total number of SASS frame noncertainty schools to the weighted sample estimate of the total number of non-certainty schools within each cell in the frame. For private schools, the adjustment is the same, except for the area frame. For the area frame, all schools in the non-certainty PSUs were in sample and we did not have universe counts for all non-certainty PSUs. These schools had a factor equal to 1. Certainty schools were excluded from the numerator and denominator of this factor and also had their factor set equal to 1.

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[12]Private schools only.

Second-Stage Ratio Adjustment Factor (for private schools only) is a factor that adjusts sample estimates based on an older sampling frame to current independent control counts. It is the ratio of the weighted 1993-94 PSS estimates of schools to the weighted 1993-94 SASS sample estimate of schools within each cell. This adjustment applies to private schools but not to public. The analogous adjustment for public, to the CCD, has yielded unsatisfactory results due to recurring definitional and other differences between CCD and SASS.

For private schools, the original SASS sampling frames covered 26,463 schools. However, an estimated 2,676 of these schools (10.1%) were found to be out-of-scope when selected for sample. In addition, 2,306 schools were picked up as births in the 1993-94 PSS updating operations, which generally happened too late to be included in the 1993-94 SASS sampling frame. Due to these differences in the sampling frames, and in order to achieve more agreement in the estimates between 1993-94 PSS and 1993-94 SASS, the decision was made to ratio adjust. Caution should be exercised in looking at estimates of change. Previous SASS estimates reflect schools that remained on the frame. By adjusting for births, some change estimates may be misleading.

9.2 School Weighting Adjustment Cells

School noninterview and first and second-stage ratio adjustments are computed within cells. The schools are classified into cells based on sample frame data for the noninterview and first stage ratio adjustments. For the second stage ratio adjustment, private schools are classified into cells using questionnaire data.

9.2.1 Public and BIA School Adjustment Cells

For public schools, (except BIA and Native American schools) the noninterview adjustment cells were: state by school grade level by enrollment size class by urbanicity. If the factor was less than or equal to 1.5 and there were at least 15 schools in the cell, no collapsing was done. Otherwise, cells were collapsed (enrollment size class first, urbanicity second, and grade level third). Collapsing reduces the variance by reducing the size of the final factor. The trade-off is the increase in bias with respect to the characteristic defining the cells. Collapsing is generally felt to reduce the overall mean-squared error of the survey estimates. See Appendix 3 for a description of the enrollment and number of teacher size classes at all stages in the weighting for all the questionnaires.

For BIA elementary schools, the noninterview adjustment cells were grade level by enrollment size class; while BIA secondary and combined schools' cells were by grade level. Cells for Native American elementary schools were grade level by state (8 levels) by enrollment size class; while secondary school cells were grade level by state (8 levels). If the factor was less than or equal to 2.0 and there were at least 10 schools in the cell, no collapsing was done. Otherwise, cells were collapsed in the same sequence as in other public schools. These collapsing criteria differ from the criteria used for public schools due to the smaller number of BIA schools and the selection with certainty. These conditions made collapsing less desirable.

The first-stage ratio adjustment cells for public schools (except BIA and Native American Indian schools) were state by grade level by urbanicity; and for Native American Indian schools, they were state (8 groups) by grade level and school enrollment for Native American Indian elementary schools while Native American Indian secondary and combined schools were by grade level. There was no first-stage ratio adjustment for BIA schools because they were all certainty schools. If the factor was between 0.667 and 1.5 and there were at least 15 (10 for Native American Indian Schools) noncertainty schools in the cell, no collapsing was done. Otherwise, cells were collapsed by the following rules: For public schools except Native American, urbanicity first and grade level second. For Native American Indian, enrollment first, grade level second, and state third.

9.2.2 Private School Adjustment Cells

For private list frame schools, the noninterview adjustment cells were: 19 associations by school grade level by enrollment. The Catholic and All Else associations additionally used urbanicity to define the cells. If the factor was less than 2.0 and there were at least 15 schools in the cell, no collapsing was done. If collapsing was done, enrollment was collapsed first, urbanicity second (for Catholic and All Else associations), grade level third and association last. The first-stage ratio adjustment cells were the same as the noninterview adjustment cells. If the factor was between 0.667 and 1.5 and there were at least 15 noncertainty schools in the cell, no collapsing was done. Otherwise, cells were collapsed (enrollment first, urbanicity second for Catholic and All Else associations, grade level third, and association last).

For private area frame schools, the noninterview adjustment cells were: affiliation (Catholic, other religious, and nonsectarian) by grade level by enrollment size class. If the factor was less than 2.0 and there were at least 15 schools in the cell, no collapsing was necessary. If collapsing was necessary, the enrollment size class was collapsed first, grade level was second, and affiliation was collapsed last. This collapsing order was determined to be in reverse order of importance to the survey. There was no first-stage ratio adjustment for area frame schools since, within frame, they were all selected with certainty.

Second-stage ratio adjustment factor cells (list and area) were defined by 19 associations by grade level. Catholic and All Else Associations additionally used enrollment. If the factor was between 0.667 and 1.5 and there were at least 15 schools in the cell, no collapsing was done. Otherwise cells were collapsed (enrollment, grade level, association).

9.3 Administrator Weight (SASS Questionnaire Forms 2A and 2B and 2C)

The public and private administrator weighting was done the same way as the school questionnaire weighting described above. Since the respondents for each of the administrator surveys and the corresponding school surveys could be different, the weighting process was done separately for each questionnaire. The sum of the administrator weights may not equal the sum of the school weights because some schools do not have administrators.

9.4 Teacher Demand and Shortage for Public School Districts (SASS Questionnaire Form 1A)

The final weight for the public school district data is:

(Basic Weight) X (Sampling Adjustment Factor) X (LEA Noninterview Factor) X (Frame Ratio Adjustment Factor)

where:

Basic Weight is the inverse of the probability of selection of the LEA. Note that LEAs were not selected directly, so the computation of this probability is rather complex. See section 9.5 for more details.

Sampling Adjustment Factor is an adjustment that accounts for unusual circumstances that affect the LEA's probability of selection, such as a merger, split or duplication. For example, if two LEAs consolidated into one, the consolidated LEA's basic weight should reflect the two chances of selection.

Noninterview Adjustment Factor is an adjustment that accounts for total LEA nonresponse. It is the weighted (basic weight X sampling adjustment factor) ratio of total eligible in-scope LEAs to the total responding in-scope LEAs, computed within cells.

Frame Ratio Adjustment Factor is a factor that adjusts the sample estimates to known frame totals. It is the ratio of the total number of noncertainty LEAs in the frame to the weighted sample estimate of the total number of noncertainty LEAs in the frame, computed within cells. Certainty LEAs were assigned a factor of 1.

Noninterview and frame ratio adjustments are computed within cells. The noninterview adjustment cells were: state by LEA enrollment size class by metro status (central city of MSA, outside central city of MSA, outside MSA) for LEAs with schools, and metro status only for LEAs without schools. If the factor was less than 1.5 and there were at least 10 LEAs in the cell, no collapsing was done. Otherwise, cells were collapsed (LEA enrollment size class first and metro status second).

The frame adjustment cells were the same as the noninterview adjustment cells. If the factor was between 0.667 and 1.5 and there were at least 10 noncertainty LEAs in the cell, no collapsing was done. Otherwise, cells were collapsed: LEA enrollment size class first and metro status second.

After reviewing the final weighted estimates, it was discovered that frame ratio adjustment collapsing had a large impact on the estimates in California, Pennsylvania, and Maine, causing large changes in total enrollment from the last SASS. Special rules were applied to correct for this bias. In California, the largest enrollment size category was split into two categories. In Pennsylvania, the collapsing criteria were relaxed to 2.0 and 0.5. from 1.5 and 0.66. In Maine, the collapsing criteria were relaxed to allow a minimum of 5 cases instead of 10. These changes considerably eased the impact collapsing had on the final estimates.

9.5 LEA Basic Weights

Given the complexity of the sampling scheme, the calculation of the LEA basic weights is not straightforward. There are three situations that need discussion: LEAs with schools, LEAs without schools, and LEAs in Delaware, Nevada and West Virginia which are all certainty LEAs.

9.5.1 LEAs with Schools

The LEA sample was not selected directly through an LEA frame. Instead, the LEAs were selected through the school (i.e., the LEAs associated with the school sample comprised the LEA sample). The basic weight, therefore, is more complicated than normal.

Since schools were stratified by grade level (elementary, secondary, and combined), and by type (Native American, other public) the probability of selection for LEA k, (P_k(sel)) can be written as follows:

$$P_k(Sel)=1-[(1-P_k(Nam,El))(1-P_k(Nam,Sec))(1-P_k(Nam,Com))(1-P_k(Pub,El))(1-P_k(Pub,Sec))(1-P_k(Pub,Com))]$$

where:

P_k(Nam,El) is the probability of selecting LEA k which contains schools that are classified as elementary and Native American . This equals the sum of the school selection probabilities for the schools which are Native American, elementary, and in LEA k. If the sum is greater than one, then P_k(Nam,El) is set equal to one.

P_k(Nam,Sec) is the probability of selecting LEA k which contains schools that are classified as secondary and Native American. This equals the sum of the school selection probabilities for the schools which are Native American, secondary, and in LEA k. If the sum is greater than one, then P_k(Nam,Sec) is set equal to one.

P_k(Nam,Com) is the probability of selecting LEA k which contains schools that are classified as combined and Native American. This equals the sum of the school selection probabilities for the schools which are Native American combined, and in LEA k. If the sum is greater than one, P_k(Nam,Com) is set equal to one.

P_k(Pub,El) is the probability of selecting LEA k which contains schools that are elementary and not Native American. This equals the sum of the school selection probabilities for the schools which are not Native American, are elementary and in LEA k. If the sum is greater than one, then P_k(Pub,El) is set equal to one.

P_k(Pub,Sec) is the probability of selecting LEA k which contains schools that are secondary and not Native American. This equals the sum of the school selection probabilities for the schools which are not Native American, are secondary and in LEA k. If the sum is greater than one, then P_k(Pub,Sec) is set equal to one.

P_k(Pub,Com) is the probability of selecting LEA k which contains schools that are combined and not Native American. This equals the sum of the school selection probabilities for the schools which are not Native American, are combined and in LEA k. If the sum is greater than one, then P_k(Pub,Com) is set equal to one.

Note that $1/P_k$(sel) equals the basic weight.

9.5.2 LEAs Without Schools

The basic weight for LEAs that have no associated schools was 6, since these LEAs were selected with equal probability at a rate of 1 in 6.

9.5.3 LEA Basic Weights for Delaware, Nevada and West Virginia

The basic weight is 1 for all LEAs in Delaware, Nevada and West Virginia since all LEAs in these three states were guaranteed being selected for sample.

9.6 Teacher Weights (SASS Questionnaire Forms 4A and 4B and 4C)

The final weight for public and private school teachers is:

(Basic Weight) X (School Sampling Adjustment Factor) X (School Nonresponse Adjustment Factor) X (Teacher-Within-School Noninterview Adjustment Factor) X (Frame Ratio Adjustment Factor) X (Teacher Adjustment Factor)

where:

Basic Weight is the inverse of the probability of selection of the teacher.

School Sampling Adjustment Factor is an adjustment that accounts for unusual circumstances that affect the school's probability of selection, such as a merger, split or duplication. We adjusted the school weight to reflect the splits and mergers we were aware of just prior to teacher sampling. Therefore, the sampling adjustment factors for schools and teachers are not the same.

School Nonresponse Adjustment Factor is an adjustment that accounts for schools that did not have teachers selected because teacher lists were not provided by the school. It is the weighted (school basic weight X school sampling adjustment factor) ratio of total eligible in-scope schools to the total in-scope schools providing teacher lists, computed within cells.

Teacher within-school noninterview adjustment factor is an adjustment that accounts for sampled teachers that did not respond to the survey. It is the weighted (product of all previously defined components) ratio of the total eligible teachers to the total eligible responding teachers computed within cells.

Frame Ratio Adjustment Factor is a factor that adjusts the sample estimates to known frame totals of number of teachers. For the set of noncertainty schools, the factor is the ratio of the

frame estimate of the total number of teachers to the weighted (all previously defined components) sample estimate of the total number of teachers. These factors are computed within cells. The sample estimate uses the frame count of the number of teachers in the school. For public schools, the 1991-1992 CCD was used as the frame and the teacher counts were in terms of FTEs. For private schools, the 1991-92 PSS was used as the frame and teacher counts were in terms of headcounts.

For teachers from certainty schools, the factor is 1.

Teacher Adjustment Factor is a factor that adjusts the inconsistency between the estimated number of teachers from the SASS school data files and the SASS teacher sample files. It is the ratio of the weighted number of teachers from the school data file for a cell to the weighted number of teachers on the teacher data file for a cell. The weight is the product of all previously defined components. This factor ensures that teacher aggregates from the school file (after imputation) will agree with the corresponding teacher estimates from the teacher file.

The school nonresponse adjustments, the teacher within-school noninterview adjustments, the frame ratio adjustments, and the teacher adjustments are computed within cells. The cells for the frame ratio adjustments are the same as those used in the school weight except for BIA schools where no frame ratio adjustment was done for the teacher weight because no teacher data existed on the BIA school sample frame. The cells for the frame adjustments are described in the school weight section.

9.6.1 Public and BIA Adjustment Cells

For public schools, the school listing form nonresponse adjustment cells were the same as those used for the school noninterview adjustment cells in the school weight except that enrollment size classes were replaced by teacher size classes for Native American schools and other public schools. The collapsing criteria were also the same as those used in the school noninterview adjustment in the school weight.

The teacher within-school noninterview adjustment cells were: state by field of teaching by teacher strata (new, experienced, bilingual, Asian, American Indian) by school urbanicity (only for experienced teachers). If the factor was less than 1.5 and there were at least 15 teachers in the cell, no collapsing was done. Otherwise, cells were collapsed (urbanicity first, teacher strata second, and field of teaching third).

The teacher adjustment cells were grade level by enrollment by teacher full-time part-time status. Teacher adjustment cells were defined using data from the school and teacher questionnaires for the numerator and denominator respectively.

9.6.2 Private Adjustment Cells

9.6.2.1 Private List Frame Adjustment Cells

For private list frame schools, the school nonresponse adjustment cells were the same as those used for the school noninterview adjustment cells in the school weight, except enrollment size classes were replaced by teacher size classes in defining the cells. The collapsing criteria were the same as those used in the school noninterview adjustment in the school weight.

The teacher within-school noninterview adjustment cells were: association membership (19 levels) by field of teaching by experience level (new/experienced). Urbanicity was additionally used to define cells in the Catholic and All Else associations. If the factor was less than 1.5 and there were at least 15 teachers in the cell, no collapsing was done. If collapsing occurred, urbanicity was collapsed first (for Catholic and All Else associations), teaching experience was collapsed second, field of teaching was collapsed third, and association was collapsed last.

The teacher adjustment cells were: affiliation by grade level by the teacher full-time/part-time status.

The list and area frame teachers were combined for this adjustment. Teacher adjustment cells were defined using data from the school and teacher questionnaires for the numerator and denominator respectively.

9.6.2.2 Private Area Frame Adjustment Cells

For private schools found on the area frame, the school noninterview adjustment cells were: affiliation (three levels) by grade level by number of teachers. If the factor was less than 2.0 and there were at least 15 schools in the cell, no collapsing was done. If collapsing occurred, teacher size class was collapsed first, grade level was collapsed second, and affiliation was collapsed last.

The teacher within-school noninterview adjustment cells were: affiliation (three levels) by field of teaching by teaching experience (new/experienced). If the factor was less than 1.5 and there was at least 15 teachers in the cell, no collapsing was done. If collapsing was done, teaching experience was collapsed first, field of teaching was collapsed second, and affiliation was collapsed last.

The teacher adjustment cells were affiliation by grade level by teacher full-time/part-time status. List and area frame teachers were combined in one table.

9.7 School Library Weights (Questionnaire Forms LS-1A, LS-1B and LS-1C)

SASS school library data are used to estimate the characteristics of schools with libraries as a proportion of total schools. Thus, library sample schools that report having a library are ratio adjusted to total SASS sample schools that report having a library. Library sample schools that report not having a library are similarly adjusted to study the characteristics of such schools. Due to reporting inconsistencies between the library survey and the school survey, library survey data is not adjusted directly to schools reporting to have libraries. Additionally, four private schools with libraries were found in schools reporting on the school questionnaire to be special education. Since special education schools were suppose to be out-of-scope, these library questionnaires were made out-of-scope. The weighting was not rerun after this took place.

The final weight for the public and private school library data is:

(School Basic Weight) X (Library Subsampling Factor) X (Sampling Adjustment Factor) X (Library Type A Noninterview Adjustment Factor) X (Library Type B Noninterview Adjustment Factor) X (First-Stage Ratio Adjustment Factor) X (Second- Stage Ratio Adjustment Factor)

School Basic Weight is the inverse of the probability of selection from the school sample file.

Library Subsampling Factor is an adjustment that accounts for the second stage of sampling for the library sample, which is the subsampling of school libraries from the SASS sample schools.

Sampling Adjustment Factor is an adjustment that accounts for unusual circumstances that affect the school's probability of selection, such as splits, mergers or duplication. This is the same factor as applied to the SASS school sample.

Type A Noninterview Adjustment Factor is an adjustment that accounts for library nonrespondents that did not report whether or not they had a library (generally refusals or unable to contact). It is the weighted (basic weight X subsample factor X sampling adjustment factor) ratio of the total of schools reporting to be with and without libraries plus schools which did not report whether or not they had a library to the total of schools with and without libraries. Schools without libraries are ratio adjusted in order to study the characteristics of such schools.

Type B Noninterview Adjustment Factor is an adjustment that accounts for school nonrespondents that reported having a library. It is the weighted (basic weight X subsample factor X sampling adjustment factor) ratio of the total

eligible in-scope libraries (schools with libraries interviewed plus not interviewed) to the total interviewed schools with libraries.

First-stage Ratio Adjustment Factor is a factor that adjusts the sample estimates to known frame totals. The adjustment is equal to the ratio of the total number of noncertainty schools in the 1993-94 SASS school frame that were eligible for the library survey to the weighted (basic weight X subsample factor X sampling adjustment factor) library sample estimate of the total number of noncertainty schools (schools not selected with certainty in both the initial SASS school sampling and library subsampling) eligible for the library survey within each cell. Certainty schools were excluded from the numerator and denominator and their adjustment factor was set equal to 1.

Second-Stage Ratio Adjustment Factor is a factor that adjusts the sample estimates based on the library sample to estimates based on the complete SASS school sample. The second-stage ratio adjustment factor is done separately for schools with libraries and schools without libraries.

Schools with Libraries: The adjustment is equal to the ratio of the final weighted count of interviewed schools (from the school sample file) that report having a library to the weighted sample estimate (using all previous steps in the library weighting) of the total number of interviewed or out-of-scope libraries when the school questionnaire indicates that it has a library within each cell.

Schools without Libraries: The adjustment is equal to the ratio of the final weighted count of interviewed schools (from the school sample file) that report <u>not</u> having a library to the weighted sample estimate (using all previous steps in the library weighting) of the total number of interviewed or out-of-scope libraries when the school questionnaire indicates that it <u>does not</u> have a library within each cell.

After the adjustments were applied to public school libraries, it was found that due to the small number of schools without libraries within a given state, the second-stage factors for schools without libraries were exceedingly large and unstable for some states, even after maximum collapsing. For this reason, for the public weighting, cells for schools with and without libraries were combined. The resulting estimates were much more stable. The final second-stage factors still correct for the distribution of subsampled libraries, but they no longer control for total schools with and without libraries within state.

9.7.1 Public and BIA School Library Adjustment Cells

For public schools except BIA schools, the Type A and Type B noninterview Adjustment cells were state by grade level by enrollment by urbanicity. If the factor was less than or equal to 1.5 and there were at least 10 schools in the cell, no collapsing was done. Otherwise, cells were collapsed (enrollment first urbanicity second, and grade level third).

For BIA elementary schools, the Type A and Type B noninterview adjustment cells were grade level by enrollment size class; while BIA secondary and combined schools cells were by grade level. If the factor was less than or equal to 2.0 and there were at least 10 schools in the cell, no collapsing was done. Otherwise, cells were collapsed (enrollment size class first, grade level second).

The first-stage ratio adjustment cells were state by grade level by urbanicity. If the factor was between 0.667 and 1.5 and there were at least 15 noncertainty schools in the cell, no collapsing was done. Otherwise, cells were collapsed (urbanicity first and grade level second).

The second-stage adjustment cells were state by grade level by school enrollment. Cells were defined based on questionnaire data. If the factor was between 0.667 and 1.5 and there were at least 15 schools in the cell, no collapsing was done. Otherwise, cells were collapsed (school enrollment first and grade level second).

9.7.2 Private School Library Adjustment Cells

Library noninterview and frame ratio adjustments are computed within cells.

For private school libraries from the list frame, the noninterview adjustment cells (for both Type A and B) were: 3 recoded affiliations by grade level by recoded urbanicity by enrollment size class. If the factor was less than 2.0 and there were at least 15 schools in the cell, no collapsing was done. Otherwise, cells were collapsed (enrollment first, urbanicity second, grade level third, recoded affiliation last).

For private school libraries from the area frame, the noninterview adjustment cells (for both Types A and B) were grade level. If the factor was less than 2.0 and there were at least 15 schools in the cell, no collapsing was done. Otherwise, cells were collapsed across grade level.

The first-stage ratio adjustments cells for private school libraries from the list frame and area frame are the same as the noninterview adjustments cells. If the factor was between .667 and 1.5 and there were at least 15 libraries in the cell no collapsing was done. Otherwise, collapsing was done (enrollment, recoded urbanicity, grade level, recoded affiliation - list frame and grade level - area frame).

For private school libraries from the list frame, the second-stage ratio adjustment cells were: 3 recoded affiliations by grade level by enrollment size class. Cells were defined based on questionnaire data. If the factor was between .667 and 1.5 and there were at least 15 libraries in the cell (school questionnaire indicates there is or is not a library), no collapsing was done. Otherwise, cells were collapsed (enrollment, grade level, recoded affiliation).

For private school libraries from the area frame, the second-stage ratio adjustment cells were grade level. Cells were defined based on questionnaire data. If the factor was between .667 and 1.5 and there were at least 15 libraries in the cell (school questionnaire indicates there is or is not a library or library questionnaire indicates there is or is not a library), no collapsing was done. Otherwise, cells were collapsed across grade level.

9.8 School Librarian Weights (Questionnaire Forms LS-2A, LS-2B and LS-2C)

SASS school librarian data is used to estimate the characteristics of schools with librarians as a proportion of total schools. Thus, library sample schools that report having a librarian are ratio adjusted to total SASS sample schools that report having a librarian. Library sample schools that report not having a librarian are similarly adjusted to study the characteristics of such schools. Due to reporting inconsistencies between the librarian survey and the school survey, librarian survey data is not adjusted directly to schools reporting to have librarians.

The final weight for the public and private school librarian data is:

(School Basic Weight) X (Library Subsampling Factor) X (Sampling Adjustment Factor) X (Librarian Type A Noninterview Adjustment Factor) X (Librarian Type B Noninterview Adjustment Factor) (Librarian Type C Noninterview Adjustment Factor) X (First-Stage Ratio Adjustment Factor) X (Second-Stage Ratio Adjustment Factor)

School Basic Weight is the inverse of the probability of selection from the school sample file.

Library Subsampling Factor is an adjustment that accounts for the second stage of sampling for the library sample, which is the subsampling of school libraries/librarians from the SASS sample schools.

Sampling Adjustment Factor is an adjustment that accounts for unusual circumstances that affects the school's probability of selection, such as splits, mergers or duplication. This is the same factor as applied to the SASS school sample.

Type A Noninterview Adjustment Factor is an adjustment that accounts for library nonrespondents that did not report whether or not they had a library (generally refusals or unable to contact) and the librarian was a refusal or unable to contact. It is the weighted (basic weight X subsample factor X sampling adjustment factor) ratio of the total of schools reporting to be with or without libraries plus schools which did not report whether or not they had a library and the librarian was a refusal or unable to contact, to the total of schools with and without libraries.

Type B Noninterview Adjustment Factor is an adjustment that accounts for librarian nonrespondents (refusal and unable to contact) from schools that reported having a library. It is the weighted (basic weight X subsample factor X sampling adjustment factor) ratio of the total eligible in-scope libraries (schools with libraries interviewed plus not interviewed) to the total eligible in-scope libraries where librarian status is known.

Type C Noninterview Adjustment Factor is an adjustment that accounts for librarian nonrespondents where librarian status is known. It is the weighted (basic weight X subsample factor X sampling adjustment factor) ratio of the total in-scope schools for which both library and librarian status are known to the in-scope schools for which both library and librarian status are known and the librarian was interviewed.

First-stage Ratio Adjustment Factor is a factor that adjusts the sample estimates to known frame totals. Librarian records contain the exact same factors as their associated library records. The adjustment is equal to the ratio of the total number of noncertainty schools in the 1994 SASS school frame that were eligible for the library survey to the weighted (basic weight X subsample factor X sampling adjustment factor) library sample estimate of the total number of noncertainty schools (schools not selected with certainty in both the initial SASS school sampling and library subsampling) eligible for the library survey within each cell. Certainty schools were excluded from the numerator and denominator and their adjustment factor was set equal to 1.

Second-Stage Ratio Adjustment Factor is a factor that adjusts the sample estimates based on the library sample to estimates based on the complete SASS school sample. The second-stage ratio adjustment factor is done separately for schools with librarians and schools without librarians.

Schools with Librarians: The adjustment is equal to the ratio of the final weighted count of interviewed schools (from the school sample file) that report having a librarian to the weighted sample estimate (using all previous steps in the librarian weighting) of the total number of interviewed or out-of-scope librarians when the school questionnaire indicates that it has a librarian. Factors are computed within each cell.

Schools without Librarians: The adjustment is equal to the ratio of the final weighted count of interviewed schools (from the school sample file) that report <u>not</u> having a librarian to the weighted sample estimate (using all previous steps in the librarian weighting) of the total number of interviewed or out-of-scope librarians when the school questionnaire indicates that it <u>does not</u> have a librarian. Factors are computed within each cell.

After the adjustments were applied to public school librarians, it was found that due to the small number of schools without libraries within a given state, the second-stage factors for schools without librarians were exceedingly large and unstable for some states, even after maximum collapsing. For this reason, for the public weighting, cells for schools with and without librarians were combined. The resulting estimate were much more stable. The final second-stage factors still correct for distribution of subsampled librarians, but they no longer control for total schools with and without librarians within state.

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9.8.1 Public and BIA School Librarian Adjustment Cells

For public schools, except BIA schools, the Type A and Type B noninterview adjustment cells were state by grade level by enrollment by urbanicity. If the factor was less than or equal to 1.5 and there were at least 10 schools in the cell, no collapsing was done. Otherwise, cells were collapsed (enrollment first, urbanicity second, and grade level third).

For BIA elementary schools, the Type A, Type B, and Type C noninterview adjustment cells were grade level by enrollment size class; while BIA secondary and combined schools' cells were by grade level. If the factor was less than or equal to 2.0 and there were at least 10 schools in the cell, no collapsing was done. Otherwise, cells were collapsed (enrollment size class first, grade level second).

The first-stage ratio adjustment cells were state by grade level by urbanicity. If the factor was between 0.667 and 1.5 and there were at least 15 noncertainty schools in the cell, no collapsing was done. Otherwise, cells were collapsed (urbanicity first and grade level second).

The second-stage adjustment cells were state by grade level by school enrollment. Cells were defined based on questionnaire data. If the factor was between 0.667 and 1.5 and there were at least 15 schools in the cell, no collapsing was done. Otherwise, cells were collapsed (school enrollment first and grade level second).

9.8.2 Private School Librarian Adjustment Cells

Librarian noninterview and frame ratio adjustments are computed within cells.

For private school librarians from the list frame, the noninterview adjustment cells (for Type A, B, and C) were: 3 recoded affiliations by grade level by recoded urbanicity by enrollment size class. If the factor was less than 2.0 and there were at least 15 schools in the cell, no collapsing was done. Otherwise, cells were collapsed (enrollment first, urbanicity second, grade level third, recoded affiliation last).

For private school librarians from the area frame, the noninterview adjustment cells (for Types A, B, and C) were grade level. If the factor was less than 2.0 and there were at least 15 schools in the cell, no collapsing was done. Otherwise, cells were collapsed across grade level.

The first-stage ratio adjustments cells for private school librarians from the list frame and area frame are the same as the noninterview adjustments cells. If the factor was between .667 and 1.5 and there were at least 15 libraries in the cell no collapsing was done. Otherwise, collapsing was done (enrollment, recoded urbanicity, grade level, recoded affiliation - list frame and grade level - area frame).

For private school librarians from the list frame, the second-stage ratio adjustment cells were: 3 recoded affiliations by grade level by enrollment size class. Cells were defined based on questionnaire data. If the factor was between .667 and 1.5 and there were at least 15 librarians in the cell (school questionnaire indicates there is or is not a librarian), no collapsing was done. Otherwise, cells were collapsed (enrollment, grade level, recoded affiliation).

For private school librarians from the area frame, the second-stage ratio adjustment cells were grade level. Cells were defined based on questionnaire data. If the factor was between .667 and 1.5 and there were at least 15 librarians in the cell (school questionnaire indicates there is or is not a librarian), no collapsing was done. Otherwise, cells were collapsed across grade level.

9.9 Student Weighting

The final weight for students from private and public schools is:

(Basic weight) X (School Nonresponse Adjustment Factor) (Misclassified Teacher Adjustment Factor) X (First-Stage Ratio Adjustment Factor) X (Student Noninterview Adjustment Factor) X (Student Adjustment Factor)

where:

Basic Weight is the inverse of the student's probability of selection conditioned on the specific set of sample teachers selected for the student sample at the school. The sum of the students' conditional probabilities at the school are adjusted to the school's enrollment as reported in the school questionnaire. This is done to approximate the student's probability of selection across all possible teacher samples at the school, a quantity which we cannot calculate given the types of information that we collect about each selected student. Attempts at collecting a student's complete class schedule, which would allow us to compute an unconditional probability of selection, proved impractical when tested. The student-within-school inverse of the probability of selection is adjusted for the school-level inverse of the probability of selection. The basic weight is expressed below. See Appendix 4 for a description of how this basic weight was derived.

$$W_{ki} = \frac{1}{P_{ki}} X \frac{school\ enrollment}{\sum_{i=1}^{6} \frac{1}{P_{ki}}} X\ W_k\ X\ F_{ki}$$

where:

W_k = basic weight for school k.

F_{ki} = school student subsampling factor.

where:

The student's probability of selection is the sum of the probabilities of selecting the student from the teachers (of the three sample teachers at the school) that teach the student.

$$P_{ki} = \sum_{j=1}^{3} P_{kji}$$

and:

P_{kji} = 0 if the j^{th} teacher does not teach student i, or equal to the result of one of the two equations defined below, depending upon whether the j^{th} teacher is departmental or self-contained. The definitions for the variables used to calculate the probability (P_{kji}) for students with departmental teachers are defined as follows:

N_{kji} = the total number of times, within school k, that student i has teacher j each week.

L_{kj} = the total number of periods the sample teacher teaches an eligible class at the sample school per week.

TP_{kj} = the teacher probability of selection for the student sample adjusted for teachers erroneously classified as not teaching regularly scheduled classes.

S_{kj} = size (enrollment) of the sample class period.

The probability of selecting the i^{th} student from the j^{th} teacher at a school k was dependent upon the probability of selecting the sample class period from the total class periods at school k (if the teacher is classified as departmental), the probability of selecting the teacher from school k, and the probability of selecting the student from the teacher's sample class period.

For students selected from departmental teachers, the formula below was used.

where:

$$P_{kji} = \left[\frac{N_{kji}}{L_{kj}}\right] \cdot \left[\frac{2}{S_{kj}}\right] \cdot TP_{kj}$$

The variables are as defined above.

For students from self-contained teachers, the formula below was used.

$$P_{kji} = \left[\frac{2}{S_{kj}}\right] \cdot TP_{kj}$$

where:

The variables are as defined above. If any components of the student-within school weighting were not collected from the school, they were imputed.

Students selected multiple times were left in sample each time they were selected. Their basic weights were subsequently averaged across each of their sample records.

School Nonresponse Adjustment Factor is an adjustment that accounts for schools that did not have students selected because the school did not participate in either the teacher or student sampling procedures. It is the weighted (school basic weight X school sampling adjustment factor X school's student subsampling factor) ratio of total eligible in-scope schools to the total in-scope schools with sample students, computed within cells.

First-stage Ratio Adjustment Factor is a factor that adjusts the sample estimates to known frame totals of the number of students. For the set of noncertainty schools, the factor is the ratio of the frame estimate of the total number of students to the weighted (all previously defined components) sample estimate of the total number of students. These factors are computed within cells. The sample estimate uses the frame count of the number of teachers in the school. For public schools, the 1991-92 CCD was used as the frame and for private schools, the 1991-92 PSS was used as the frame.

For the set of certainty schools, the factor is 1.

Misclassified Teacher Adjustment Factor is an adjustment that accounts for sampled teachers reported to not be teaching regularly scheduled classes during student sampling, but later reported to be teaching in the teacher survey.

Student Noninterview Adjustment Factor is an adjustment that accounts for sampled students whose schools did not return questionnaires at all or returned incomplete questionnaires. It is the weighted (product of all previously defined components) ratio of the total eligible students to the total eligible responding students computed within cells.

Student Adjustment Factor is a factor that adjusts the inconsistency between the estimated number of students from the SASS school data files and the SASS student sample files. It is the ratio of weighted number of students from the school data file for a cell to the weighted number of students on the student data file for a cell. The weight is the product of all previously defined components. This factor ensures that student aggregates from the school file (after imputation) will agree with the corresponding student estimates from the student file.

The school nonresponse adjustments, the misclassified teacher adjustments, the student noninterview adjustments, the first-stage ratio adjustments, and the student adjustments are computed within cells. The cells for the first-stage ratio adjustments are the same as those used in the school weight except that public schools in Alaska and those in all other states used the same cells but were processed separately.

9.9.1 Public and BIA Student Adjustment Cells

For public schools, the school nonresponse adjustment cells were the same as those used for the school noninterview adjustment cells in the school weight. The collapsing criteria were also the same as those used in the school noninterview adjustment in the school weight.

The misclassified teacher adjustment cells were: teacher subject by region for regular public schools, teacher subject by state for Native American schools, and just teacher subject for BIA schools. If collapsing occurred, teacher subject collapsed.

The student noninterview adjustment cells were: state by grade level by school enrollment by teacher departmental/self-contained status. If the factor was less than 1.5 and there were at least 15 students in the cell, no collapsing was done. If collapsing occurred, cells were collapsed by teacher status first, enrollment second, then grade level and finally state.

The student adjustment cells were grade level by enrollment by race/ethnicity. If collapsing occurred, cells were collapsed by race/ethnicity first, enrolment second, and finally grade level. Cells were defined using questionnaire data.

After reviewing the final-weighted estimates for public schools by race, it was noticed that the standard errors of these estimates were exceedingly large and the distribution by race and grade level was severely biased. This bias was primarily caused by collapsing of the student adjustment cells. In order to remedy the situation, the collapsing criteria for factor range were relaxed to 3.0 and 0.3. The weights for American Indian students from regular public schools were also truncated at 18,000, and the weight redistributed to other American Indian students from regular public schools. As a further refinement, the order of collapsing was altered to collapse across enrollment size first, then grade level, and finally race.

These three changes caused the bias in the race by grade level estimates to be reduced considerably. The changes also greatly reduced the variance of estimates of American Indian students by grade level. See Appendix 5 for a detailed breakdown of the effect of these changes to the weighting procedure.

9.9.2 Private Student Adjustment Cells

For private schools, the school nonresponse adjustment cells were the same as those used for the school noninterview adjustment cells in the school weight, and the collapsing criteria were also the same.

The misclassified teacher adjustment cells were: teacher subject by major affiliation (Catholic, other religious, nonsectarian). If collapsing occurred, teacher subject collapsed first, then major affiliation.

The student noninterview adjustment cells were: affiliation by enrollment by teacher departmental/self-contained status. If the factor was less than 1.5 and there were at least 15 students in the cell, no collapsing was done. If collapsing occurred, cells were collapsed by teacher status first, enrollment second, then grade level.

The student adjustment cells were: affiliation by grade level by race/ethnicity. If collapsing occurred, cells were collapsed by race/ethnicity first, grade level next, and finally affiliation. Cells were defined using questionnaire data.

10. Item Response Rates and Imputation

10.1 Item Response Rates

The unweighted item response rates (i.e., the number of sample units responding to an item divided by the number of sample units that should have responded to that item) for the components of the SASS ranged from 50 percent to 100 percent. Tables 23 and 24 provide a brief summary of the item response rates; these rates are unweighted and do not reflect additional nonresponse due to respondents' refusal to participate in the survey.

Table 23.--Summary of Unweighted Item Response Rates by Questionnaire

Questionnaire	Range of item response rates	Percent of items with a response rate of 90% or more	Percent of items with a response rate of less than 75%
LEAs (SASS-1A)	67-100%	91%	1%
Principals			
Public (SASS-2A)	65-100%	92%	4%
Private (SASS-2B)	55-100%	90%	6%
Indian (SASS-2C)	72-100%	91%	1%
Schools			
Public (SASS-3A)	83-100%	83%	0%
Private (SASS-3B)	61-100%	77%	3%
Indian (SASS-3C)	70-100%	84%	1%
Teachers			
Public (SASS-4A)	71-100%	91%	0%
Private (SASS-4B)	69-100%	89%	1%
Indian (SASS-4C)	70-100%	84%	3%
Students (SASS-5)			
Public	90-100%	97%	0%
Private	84-100%	97%	0%
Indian	79-100%	88%	0%
Library Media Centers			
Public (LS-1A)	57-99%	81%	5%
Private (LS-1B)	66-99%	80%	4%
Indian (LS-1C)	61-100%	82%	1%
Librarians			
Public (LS-2A)	61-100%	87%	6%
Private (LS-2B)	50-100%	80%	11%
Indian (LS-2C)	56-100%	87%	5%

Source: 1993-94 Schools and Staffing Surveys - all components.

Table 24.--Items with Response Rates of Less Than 75 Percent

Questionnaire	Items[13]
LEAs (SASS-1A)	26c(2)
Principals	
Public (SASS-2A)	14b(1,1), 14b(2,1), 14b(4,1), 14b(5,1), 14b(7,1), 14b(8,1)
Private (SASS-2B)	14b(1,1), 14b(2,1), 14b(4,1), 14b(5,1), 14b(8,1), 21a, 21c, 28b
Indian (SASS-2C)	14b(8,1)
Schools	
Public (SASS-3A)	None
Private (SASS-3B)	31c(2), 31c(5), 31c(6), 31c(7), 31c(8), 31c(9)
Indian (SASS-3C)	45
Teachers	
Public (SASS-4A)	41c
Private (SASS-4B)	39, 51c, 55
Indian (SASS-4C)	2, 4, 9c, 39, 41c, 53b(3)amount, 55
Students (SASS-5)	
Public	None
Private	None
Indian	None
Library Media Centers	
Public (LS-1A)	5a(4), 5b(2), 5b(4), 5c(4), 25
Private (LS-1B)	5b(2), 5b(4), 5c(3), 25
Indian (LS-1C)	25
Librarians	
Public (LS-2A)	14d(PhD), 18b(5), 18b(6), 18b(7), 18b(8), 18b(9), 18b(10)
Private (LS-2B)	14c(ed.spec.), 14d(ed.spec.), 14c(Phd), 14d(PhD), 18b(1), 18b(4), 18b(5), 18b(6), 18b(7), 18b(8), 18b(9), 18b(10), 26d
Indian (LS-2C)	18b(4), 18b(6), 18b(7), 18b(8), 18b(9), 18b(10)

Source: 1993-94 Schools and Staffing Surveys - all components.

[13]The questionnaire wording for these items can be found in SASS and PSS Questionnaires: 1993-1994, U.S. Department of Education, National Center for Education Statistics, NCES 94-674.

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10.2 Imputation Procedures

For questionnaire items that should have been answered but were not, values were imputed in hierarchical order as described in the following sections by (1) using data from other items on the questionnaire, (2) extracting data from a related component of the Schools and Staffing Survey (for example, using data from a school record to impute missing values on the questionnaire for the LEA that operates the school), (3) extracting data from the sample file (information about the sample case from the Private School Survey or the Common Core of Data, collected in the 1991-92 school year), and (4) extracting data from the record for a sample case with similar characteristics (commonly known as the "hot deck" method for imputing for item nonresponse[14]).

For some incomplete items, the entry from another part of the questionnaire, the sample file, or the data record for a similar sample case was directly imputed to complete the item; for others the entry was used as part of an adjustment factor with other data on the incomplete record. For example, if a respondent did not report whether a school offered remedial reading in item 22a of the public school questionnaire, the response (Yes or No) for a similar school was imputed to item 22a of the incomplete record. However, if a respondent had answered "Yes" to item 22a but had not reported the number of students in the program, the ratio of number of students in remedial reading to total enrollment for a similar school was used with the enrollment at the school for which item 22a was incomplete to impute an entry to item 22a (i.e., SCHOOL A item 22a = SCHOOL A ENROLLMENT multiplied by the ratio of SCHOOL B item 22a to SCHOOL B ENROLLMENT).

The procedures described above were carried by computer processing. However, for a few items there were cases where entries were clerically imputed. The data record, sample file record and, in some cases, the questionnaire were reviewed and an entry consistent with the information from those sources was imputed. This procedure was used when (1) there was no suitable record to use as a donor, (2) the computer method produced an imputed entry that was outside the acceptable range for the item, or (3) there were very few cases where an item was unanswered (usually less than ten).

Values were imputed to items with missing data within records classified as interviews (ISR=1). Noninterview adjustment factors were used during the weighting process to compensate for data that were missing because the sample case was a noninterview (ISR=2).

10.2.1 Imputation Procedures: Teacher Demand and Shortage Questionnaire for Public School Districts (SASS-1A)

Data were imputed in the three stages described below. Figure 1 shows the percentage of entries imputed in each stage for items where the response rate was less than 75 percent.

First Stage Imputation for TDS

In the first stage, TDS questionnaire items with missing values were filled whenever possible by using information about the LEA from the following sources:

1. *Other questionnaire items on the LEA's SASS-1A record* - Based on entries from related questionnaire items, assumptions were made about how the respondent should have answered items with missing values. For example, if teachers were not reported by grade level in item 10 and item 5 indicated that all students in the LEA were ungraded (i.e., not assigned to grades 1, 2, etc.), the assumption was made that the teachers were

[14] See Kalton, G., and Kasprzyk, D. (1982), Kalton, G. (1983), Kalton, G., and Kasprzyk, D. (1986), Little, R.J.A., and Rubin, D.B. (1987), and Madow, W.G., Olkin, I., and Rubin, D.B. (1983).

also ungraded and the total count of teachers was imputed to part a (Ungraded) of item 10. Items where entries may have been imputed by using data from other SASS-1A items are listed in Figure 2.

2. *For one-school LEAs, the SASS-3A record for that school* - If the LEA with missing data operated only one school and information for that school was collected in the 1993-94 SASS, entries from the school record were used to fill items with missing values on the LEA record whenever possible. For example, if a one-school LEA did not report students by grade level in item 5 and counts of students by grade level were reported on the SASS-3A for the school, those counts were imputed to item 5 of the LEA record. The SASS-1A items shown in Figure 3 were imputed with school data when available.

3. *The LEA's sample file record, which included data from the 1991 Common Core of Data (CCD)* - For a few cases, CCD data from the sample file was used to impute entries to items 5 and 22. If item 5 (students by grade level) was incomplete and could not be completed by using school information, data from the sample file were used to impute lowest and highest grade levels in the LEA. If item 22a was not answered and the CCD data indicated that the LEA did not provide prekindergarten programs, code 1, "No programs for prekindergarten-age children," was imputed to item 22a.

In addition to filling items where values were missing, some inconsistencies between items were corrected by ratio adjustment during the first stage of imputation. For records where the sum of the entries in item 7 (students by race) did not equal the LEA's total enrollment in item 6, the item 7 entries were adjusted to be consistent with item 6. For those where the sum of the entries in item 17 (teachers by race) was not consistent with the count of teachers in item 10, the entries in item 17 were adjusted. For example, if the sum of the students reported by the racial categories in item 7 were greater than the LEA's total enrollment reported in item 6, the assumption was made that the distribution of students across the categories was correct, and the counts in item 7 were adjusted to fit the total reported in item 6 (i.e, each entry in item 7 was multiplied by the ratio of the LEA's enrollment to the sum of the entries in item 7).

Second Stage Imputation for TDS

In general, the second stage of imputation filled unanswered items by using data from the record for a similar LEA, i.e., an LEA that was the same level, of similar size, with a similar percentage of minority students, etc. Variables which describe certain characteristics of the LEAs (e.g., enrollment size, instructional level, and percent minority students) were created and used to sort the records and to match incomplete records to those with complete entries (donors). The nearest record in the sort became the donor. The imputation variables are defined in Figure 4.

During the second stage of imputation, items on the LEA questionnaire were grouped according to the relevance of the imputation variables to the data collected by the item. For example, LEVEL was the most important variable for matching incomplete records and donors to fill item 5 (students by grade level) but LEVEL was not used to match LEAs to impute item 25 (choice programs).

Figure 5 shows the groups of items, the matching variables for each group, and the order of collapse for the matching variables. The items are listed in the order in which they were imputed.

The SASS-1A records were sorted so that records for similar LEAs were near each other on the file. Before the second stage of imputation for items 5, 8, 10, 11, 13, 14, 19, 20, 21, 22, 26, 27, 29, 31, 32, 33, the LEA records were sorted by GROUP / STATE / LEVEL / MSC91 / D0255. For items 7, 9, 12, 15, 16, 17, 18, 23, 24, 25, 28, 30, 34, 35, 36, 37, 38, 39, 40, 41, 42, the records were sorted by GROUP / STATE/ MSC91 / D0255. D0255 is the LEA's total enrollment for kindergarten through twelfth grade.

For some items, such as item 8 (number of days in school year), data were directly copied to the record with the missing value. For others, such as item 23b (students in Chapter 1 programs), the entries on the donor record were used as factors along with other questionnaire data to fill the incomplete items. For example, if item 23b (number of students in Chapter 1 programs) were unanswered for LEA#1, the percent of students in Chapter 1 on the donor record would have been used with the total enrollment in LEA#1 to calculate and impute the number of Chapter 1 students in LEA#1.

Clerical Imputation for TDS

For less than ten cases, one or more entries were clerically imputed to items 17, 36b, 37b, 38b, and/or 38c.

10.2.2 Imputation Procedures: Public School Principal Questionnaire (SASS-2A) Private School Principal Questionnaire (SASS-2B) Indian School Principal Questionnaire (SASS-2C)

Data were imputed in the three stages described below. Figure 1b shows the percentage of entries imputed in each stage for items where the response rate was less than 75 percent.

First Stage Imputation for Principals

During the first stage, items with missing values were filled by using other data from the same record or by making some assumptions about the respondent's intended answer (e.g., not answering means "No" or "None"). Values were imputed to the following items during the first stage: 5a, 5c, 5d, 5f, 7a, 8a, 8c, 9a, 10a, 10d, 11, 12, 13, 14b, 16, 19, 21, 25.

Also during the first stage, imputation variables were created from questionnaire data or copied from the matching school record. These variables were used during the second stage of imputation.

Second Stage Imputation for Principals

The second stage imputation variables for the SASS-2A/2B hot deck imputations are defined in Figure 6. The sort orderings for the principal records are described below.

Public school principals - There were two sorts for the public school principal records. The records were sorted by STATE / NLEVEL / EDUEXP / YEARPRIN / AGE for items 5-21. For items 22-29, the records were sorted by STATE / NLEVEL / URB / YRPRINSC / ENR. The sort variables and the matching variables are defined in Figure 6. The matching variables' order of collapse for items imputed in the second stage are given in Figures 7 and 8.

Private school principals - There were two sorts for the private school principal records. The records were sorted by AFFLG / AFFILS / NLEVEL / EDUEXP / YEARPRIN / AGE for items 5-21. For items 22-29, the records were sorted by AFFLG / AFFILS / NLEVEL / URB / YRPRINSC / ENR. The sort variables and the matching variables are defined in Figure 6. The matching variables' order of collapse for items imputed in the second stage are given in Figures 9 and 10.

Indian school[15] principals - Because there were only 148 completed records[16] (interviews) for Indian school principals and the item response rates were

[15] Within this chapter, "Indian school" refers to schools selected to receive the SASS-3C school questionnaire; i.e., schools funded by the Bureau of Indian Affairs (BIA) that were not operated by a local education agency (LEA). These schools may be operated by the BIA, a tribe, or a private contractor.

[16] The number of records for Indian school principals is less than the number of school records noted in section 10.2.3 because some Indian school principals refused to complete the principal questionnaire (SASS-3C).

very high for all items, imputation was done clerically. The computer records were sorted by BIA status (whether school was operated by the Bureau of Indian Affairs), state, and size so that records for principals of similar schools were close together. The actual questionnaires were also reviewed for notes and other entries which were useful in deciding the entries to be imputed. If an item could not be filled by using information on the questionnaire, entries from the record for the principal of a similar school were used.

Clerical Imputation for Public and Private School Principals

If item 6b (location of college where principal received bachelor's degree) was unanswered, the entry was clerically imputed by using the name of the college reported in item 6a. For most cases where the principal did not answer item 27 (gender), his/her name was used to impute the entry; if the name was missing or ambiguous, a donor was used. Item 30 (year of birth) was imputed clerically by using year of bachelor's degree and years of work experience.

10.2.3 Imputation Procedures: Public School Questionnaire (SASS-3A)

Data were imputed in these three stages:

First Stage Imputation for Public Schools

In the first stage, public school questionnaire items with missing values were filled whenever possible by using information about the school from these sources:

1. *Other questionnaire items on the school's SASS-3A record* - Based on entries from related items on the school record, assumptions were made about how the respondent should have answered items with missing values. For example, if the type of school was not reported in item 14 and item 22 indicated that 90 percent or more of the school's students participated in programs for students with disabilities, code 4, "Special Education," was imputed to item 14. Figure 11 shows the items that may have been completed by using entries from other SASS-3A items.

2. *The Library Survey* - If items related to the school's library or librarian were unanswered and the school participated in the SASS Library Survey, information from the Library Survey questionnaires (LS-1A, LS-2A) was used whenever possible. For example, if the number of full-time librarians was not reported in item 17e but was reported on the Library Media Center Questionnaire (LS-1A) for the school's library, the count of full-time librarians was copied from the LS-1A to item 17e of the school record. These items were completed by using Library Survey data: 16e, 16h, 17e, 17h, 23.

3. *The SASS-2A record for the school's principal* - If the number of principals was not reported in items 16 and 17 and the Public School Principal Questionnaire (SASS-2A) indicated that the school did not have a principal, zero was imputed for the number of full-time and part-time principals in items 16 and 17.

4. *The SASS-1A record for the LEA that operated the school* - If the school's LEA participated in SASS, information from the LEA's SASS-1A record was used to complete some unanswered items on the school record. For example, if the school did not report in item 26 whether or not it offered prekindergarten programs, but the LEA record indicated there were no prekindergarten programs offered by the LEA, code 1, "No programs for prekindergarten-age children," was imputed to item 26 of the school record. For schools in one-school LEAs, more data were extracted from the district record to impute values to the school record. Public School Questionnaire (SASS-3A) items that were imputed by using data from the Teacher Demand and Shortage Questionnaire for

Public School Districts (SASS-1A) are shown in Figure 12.

5. *The school's sample file record, which included data from the 1991 Common Core of Data (CCD)* - If unanswered items could not be completed by using information from other items on the school record, the Library Survey, the Principal Questionnaire, or the Teacher Demand and Shortage record for the school's LEA, CCD data on the school's sample file record were used. For example, if counts of students by racial categories were not reported in item 9 and counts from the 1991 CCD were available on the sample file record, the proportions of students reported in the categories on the sample file were used to allocate the school's enrollment to the categories in item 9. These items were filled by using the CCD data in the sample file: 7, 9, 14, 25, 26.

In addition to filling items where values were missing, some inconsistencies between items were corrected by ratio adjustment during the first stage of imputation. For records where the sum of the entries in item 9 (students by race) did not equal the enrollment reported in item 8, the item 9 entries were adjusted to be consistent with item 8. For those where the number of teachers reported in item 18 (teachers by race) was not consistent with the number reported in items 16g and 17g, the entries in item 18 were adjusted. For example, if the sum of the students reported by the racial categories in item 9 were greater than the school's total enrollment reported in item 8, the assumption was made that the proportions assigned to the categories were correct and the counts in item 9 were adjusted to fit the total reported in item 8; i.e., each entry in item 9 was multiplied by the ratio of the enrollment reported in item 8 to the sum of the entries in item 9.

Second Stage Imputation for Public Schools

In the second stage of imputation, SASS-3A items with missing values were filled by using data from the record for a similar school, i.e., a school that was the same level, type, etc. Variables that describe certain characteristics of the school (e.g., type of community where school is located, type of school, and instructional level) were created and used to sort the records and to match incomplete records to those with complete data (donors), for items related to the sort variables. Thus items were imputed in groups. These sort variables are described in Figure 13.

During the second stage of imputation, items on the public school questionnaire were grouped according to the relevance of the imputation variables to the data collected by the item. For example, TYPE was used for matching incomplete records and donors to fill item 22 (school programs and services) but was not used for item 11 (number of absent students).

Figure 14 shows the groups of items, the matching variables for each group and the order of collapse for the matching variables. Items are listed in the order in which they were imputed.

The SASS-3A records were sorted so that records for similar schools were near each other on the file. Before the second stage of imputation for items 7, 10, 12, 13, 16, 17, 22, 25, 23, 26, 29, 30, 33, the records were sorted by STATE / LEVEL / TYPE / DSTCNY / S0255. For items 9, 11, 15, 18, 19, 20, 21, 24, 27, 28, 31, 32, the records were sorted by STATE / LEVEL / MINEN / URB / DSTCNY / S0255. DSTCNY was a sample file code that identified the state and county where the school was located. S0255 was the school's total enrollment.

The records for schools within each state were treated as a separate data set, and the donor schools and recipient schools had to be within the same state.

For some items, such as item 32 (whether school had an alcohol or drug abuse counseling program), data were copied from the donor to the record with the missing value. For others, such as item 19 (number of absent teachers), the entries on the donor record were used as factors along with other questionnaire data to fill the incomplete items. For example, if item 19 were unanswered for school#1, the percent of teachers who were absent on the donor record would have been

used with the total teacher count for school#1 to calculate and impute the number of absent teachers for school#1.

Clerical Imputation for Public Schools

These items were clerically imputed for some public school records: 10, 11, 16d-k, 17, 18, 21, 22, 27b, 28c, 28d, 30b, 30c.

10.2.4 Imputation Procedures: Private School Questionnaire (SASS-3B)

Because the 1993-94 school year was a survey year for both SASS and the Private School Survey (PSS), the SASS Private School Questionnaire was modified to include all the PSS questions, so that private schools selected for SASS would not be asked to fill two school questionnaires. Items 6-8, 11-14, 16, 17, 20, 23, 38, and 44 (the PSS items within the SASS-3B records) were processed with the PSS records for private schools that were not selected for SASS. Therefore, the imputation for the SASS-3B data was done in six stages -- stage 1, stage 2 and clerical imputation for PSS items; stage 1, stage 2 and clerical imputation for non-PSS items.

In general the procedures used for imputing PSS items and those for the rest of the SASS-3B items were the same. Figure 1b shows the percentage of entries imputed in each stage for items where the response rate was less than 75 percent.

First Stage Imputation for Private Schools

In the first stage of imputation, values for missing items were imputed whenever possible by using information about the school from these sources:

1. *The 1991-92 Private School Survey* - If any of the PSS items (items 6-8, 11-14, 16, 17, 20, 23, 38, 44) on the SASS-3B record were unanswered, data from the 1991-92 PSS were used to fill the items with missing values whenever possible. For example, if the school's religious affiliation was not reported in item 13c and it had been reported on the 1991-92 PSS questionnaire, the PSS entry was copied to item 13c of the SASS-3B record.

2. *Other questionnaire items on the school's SASS-3B record* - Based on entries from related items on the school record, assumptions were made about how the respondent should have answered items with missing values. For example, if the number of part-time professional support services staff was not reported in item 21g and item 34 indicated that the school did not provide any diagnostic or prescriptive services, medical services, or programs for students with disabilities, the assumption was made that the school had no part-time professional support services staff and zero was imputed to item 21g. Figure 15 shows the items that may have been completed by using entries from other SASS-3B items.

3. *The Library Survey* - If items related to the school's library or librarian were unanswered and the school participated in the SASS Library Survey, information from the Library Survey questionnaires (LS-1B and LS-2B) was used whenever possible. For example, if the number of full-time librarians was not reported in item 22f but was reported on the Library Media Center Questionnaire (LS-1B) for the school's library, the count of full-time librarians was copied from the LS-1B to item 22f of the school record. These items were completed by using Library Survey data: 21f, 21h, 22f, 22h, 35.

4. *The SASS-2B record for the school's principal* - If the number of principals was not reported in items 21 and 22 and the Private School Principal Questionnaire (SASS-2B) indicated that the school did not have a principal, zero was imputed for the number of full-time and part-time principals in items 21 and 22.

In addition to filling items where values were missing, some inconsistencies between items were corrected by ratio adjustment during the first stage of imputation. For records where the number of students reported in item 8 (students by race) did not equal the enrollment reported in item 7, the item 8 entries were adjusted to be consistent with item 7. For those where the number of teachers reported in item 24 (teachers by race) did not equal the number reported in item 23, the entries in item 24 were adjusted. For example, if the sum of the teachers reported by the racial categories in item 24 were greater than the total number of teachers reported in item 23, the assumption was made that the proportions assigned to the categories in item 24 were correct and the counts in item 24 were adjusted to fit the total reported in item 23, i.e., each entry in item 24 was multiplied by the ratio of the teacher count reported in item 23 to the sum of the entries in item 24.

Second Stage Imputation for Private Schools

In the second stage of imputation, SASS-3B items with missing values were filled by using data from the records for similar schools, i.e., schools that were the same level, type, size, etc. As noted previously, items 6-8, 11-14, 16, 17, 20, 23, 38, and 44 were imputed during the PSS processing. Therefore, for these items, the imputed entries could have come from private schools not selected for SASS, as well as those that participated in SASS. For non-PSS items, entries were imputed by using data from other SASS private schools.

Variables that describe certain characteristics of the schools (e.g., religious affiliation, size, and instructional level) were created and used to sort the records and to match incomplete records to those with complete data (donors). These variables are defined in Figure 16.

During the second stage of imputation for both PSS and SASS, questionnaire items were grouped according to the relevance of the imputation variables to the data collected by the item. For example, type of community (URB) was used for matching incomplete records and donors to fill item 10 (students by racial categories) but was not used for item 12 (length of school day).

Figures 17a and 17b show the groups of items, the matching variables for each group and the order of collapse for the matching variables. Items are listed in the order in which they were imputed.

PSS Items - The PSS school records (those selected for SASS and those that were not) were sorted so that records for similar schools were near each other on the file.

1. For PSS items 7, 9, 12, 13, 16, and 17 (SASS items 6, 44, 23, and 38), the records were sorted by LEVEL / AFFLG / AFFILS / TYPE.

2. For PSS items 11, 18, 19, and 20 (SASS items 11, 13, 14, and 20), the records were sorted by AFFLG / AFFILS / AFFILR / TYPE / URB / REGION / STATE.

3. For PSS item 10 (SASS item 8), they were sorted by AFFLG / AFFILS / URB / REGION.

4. For PSS item 14 (SASS item 16), they were sorted by AFFILS / UNGRADE / STATE / P180 (school's enrollment).

Non-PSS Items - The records for private schools that participated in SASS were also sorted so that records for similar schools were near each other on the file.

1. For items 9, 18, 19, 27, 41-43, 45-51, 15, 21, 22, 31, 32, and 34, the SASS-3B records were sorted by AFFLG / LEVEL / AFFILS / TYPE / AFFILR / URB / S0255 (school's enrollment).

2. For items 10, 29, 35, 37, 24, 33, 36, 39, 40, 25, 29, 30, and 52-57, the records were sorted by AFFLG / LEVEL / AFFILS / URB / MINEN / S0255 (school's enrollment).

Clerical Imputation for Private Schools

These items were clerically imputed on a few private school records: 8, 11, 13c, 16b, 22a, 24, 25, 26b-d, 33b, 33d(1), 34f, 50, 51.

10.2.5 Imputation Procedures: Indian School Questionnaire (SASS-3C)

Because there were only 152 completed records (interviews) for Indian schools and the item response rates were very high for all items, imputation was done clerically. The computer records were sorted by BIA status (whether school was operated by the Bureau of Indian Affairs), state, and size so that records for similar schools were close together. The questionnaires were reviewed for notes and other entries that were useful in deciding the entries to be imputed. If an item could not be filled by using information on the questionnaire, entries from the record for a similar school were used.

10.2.6 Imputation Procedures: Public School Teacher Questionnaire (SASS-4A) Private School Teacher Questionnaire (SASS-4B) Indian School Teacher Questionnaire (SASS-4C)

Data were imputed in the three stages described below. Figure 1 shows the percentage of entries imputed in each stage for items where the response rate was less than 75 percent.

First Stage Imputation for Teachers

During the first stage, items with missing values were filled by using other data from the same record or by making some assumptions about the respondent's intended answer (i.e., not answering a question implies a "No" response).

Values were imputed to the following items during the first stage if enough information was available: 3c, 6, 9, 10, 13, 14, 15, 16b, 17, 18, 19, 20, 21b, 24b, 27, 28, 29, 42b, 51, 56, 57a, 63a.

Also, during the first stage, imputation variables were created from questionnaire data or copied from the matching school record. These variables (SASS-4A/4B/4C imputation variables) were used during the second stage of imputation. They are given in Figure 18.

Second Stage Imputation for Teachers

During the second stage, a hot deck method of imputation was used to fill items that still had missing values. The variables listed in Figure 18 were used to sort the teacher records and to match incomplete records to records with complete data (donors). The sort orderings are provided below. Items on the teacher questionnaire were grouped according to the relevance of the imputation variables to the data collected by the item.

Items 15c, 17c, 18c, 19c, 20d, 25a, 39, 40a were all imputed during the internal imputations. Items 1, 5, 21a, 22a, 36 were required items for all responding teachers and, therefore, did not require imputation.

Public school teachers - The records were sorted by STGRQUP / STATE / TEALEVEL / GRADELEV / URB / TEAFIELD / ENROLMNT. The matching variables and their order of collapse for items imputed in the second stage are given in Figure 19. Items are listed in the order in which they were imputed.

Private school teachers - The records were sorted by AFFLG / AFFILS / TEALEVEL / GRADELEV / URB / TEAFIELD / ENROLMNT. The matching variables and their order of collapse for items imputed in the second stage are given in Figure 20. Items are listed in the order in which they were imputed.

Indian school teachers - The records were sorted by BIAOP / TEALEVEL / GRADELEV / TEAFIELD / ENROLMNT. The matching variables and their order of collapse for items imputed in the second stage are given in Figure 21. Items are listed in the order in which they were imputed.

Clerical Imputation for Teachers

The following items were clerically imputed for some teacher records: items 2, 3, 4, 8, 10a, 11c, 11d, 20c, 23, 25c, 26b, 31d, 31e, 38, 41, 42, 43a, 49b, 50b, 51, parts of item 53, 57b, 61b, 62b.

10.2.7 Imputation Procedures: Student Records Questionnaire (SASS-5)

Data were imputed in these three stages:

First Stage Imputation for Students

During the first stage, items with missing values were filled by using other data from the same record or by making some assumptions about the respondent's intended answer (e.g., not answering means "No" or "None"). Values were imputed to the following items during the first stage if enough information was available: 5, 7, 11, 13, 24, 25, 27.

Also during the first stage, imputation variables were created from questionnaire data or copied from the matching school record. These variables were used during the second stage of imputation.

Second Stage Imputation for Students

The second stage imputation variables for the SASS-5 hot deck imputations are defined in Figure 22. The sort orderings for the student records are described below.

Public school students- The records for public school students were sorted by STATE / INDPER / TYPE / GRLEVEL / NLEVEL. The matching variables and their order of collapse for items imputed in the second stage are given in Figure 23.

Private school students- The records for private school students were sorted by AFFLG / INDPER / TYPE / GRLEVEL / NLEVEL. The matching variables and their order of collapse are given in Figure 24.

Indian school students- The records for Indian school students were sorted by GROUP / GRLEVEL. The matching variables and their order of collapse are given in Figure 25.

Clerical Imputation for Students

These items were clerically imputed for all cases where they had missing values: 4 (gender), 19b (grade in which student was retained), 21 (math course), 22 (science courses). For a few cases, entries were clerically imputed to items 5, 7b-e, 8b, 26, and 27.

10.2.8 Imputation Procedures: Public, Private, and Indian School Library Media Center Questionnaires (LS-1A, LS-1B, LS-1C)

Data were imputed to items with missing values in the three stages described below. Figure 1b shows the percentage of entries imputed in each stage for items where the response rate was less than 75 percent.

First Stage Imputation for Library Media Centers

In the first stage, items with missing values were completed whenever possible by using information about the school library from the following sources:

1. *Other questionnaire items on the library record* - Based on entries from related items on the library record, some assumptions were made about how the respondent probably should have answered items with missing values. For example, if item 1a (number of certified library media specialists) were unanswered and item 2 indicated that none of the library's staff had a bachelor's or higher degree, the assumption was made that the library had no certified library media specialists and zero was imputed to item 1a. Items which were completed by using data from other Library Media Center Questionnaire (LS-1A/1B/1C) entries are listed in Figure 26.

2. *The matching Library Media Specialist/Librarian Questionnaire (LS-2A/2B/2C)* - If items related to professional staff were unanswered on the library record, information from the matching librarian questionnaire was used to complete the items whenever possible. For example, if item 2 (degrees earned by professional staff) were unanswered, the library had only one professional staff member, and the LS-2 indicated the he/she had a master's degree, then "1" was imputed to part c of item 2 and zero was imputed to parts a, b, and d. Items 1a, 1b, 2, and 3 were imputed by using information from the LS-2.

3. *The matching SASS School Questionnaire (SASS-3A/3B/3C)* - For a few items with missing values, data from the matching school record were used to impute the entries. For example, if item 1a was unanswered and entries on the school record indicated that the school did not have a librarian, zero was imputed to item 1a of the library record. These Library Media Center Questionnaire (LS-1) items were completed with data from the matching SASS school record: Items 1a, 1b, and 1d (LS-1B only).

Second Stage Imputation for Library Media Centers

In general, the second stage of imputation filled unanswered items by using data from the record for a library of a similar school, i.e., a school that was the same level, of similar size, located in same type of community, etc. Variables that described certain characteristics of the schools (e.g., enrollment size and instructional level) were copied from the matching school record. In addition, a variable that categorizes the size of the library was created by using the number of books held at the end of the 1992-93 school year (recorded in item 5 of the Library Media Center Questionnaire). These school variables and the library variable were used to sort the library records and to match incomplete records to those with complete entries (donors).

For some items, such as item 8 (respondent's assessment of quality of library's collection), data were directly copied to the record with the missing value. For others, however, such as item 25 (number of students who used library in a week), entries on the donor record were used as factors along with other information on the incomplete record to fill the items with missing values. For example, if the number of subscriptions acquired were reported in item 5 for Library#1 but the number held was not, the donor's ratio of subscriptions held to subscriptions acquired was used with the number of subscriptions acquired by Library#1 to impute the number held by Library#1.

Public school library media centers (LS-1A) - The variables used to sort LS-1A records and match incomplete records with donors are defined in Figure 27.

The LS-1A records were sorted so that records for libraries of similar schools were near each other on the file. They were sorted in this order: STATE / ENR / LEVEL / URB / M051. M051 was the number of books held in the library at the end of the 1992-93 school year.

Figure 28 shows the variables that were used to match incomplete records and donors for each LS-1A item imputed during the second stage. The order of collapse for the variables is also shown in Figure 28.

Private school library media centers (LS-1B) - The variables used to sort the LS-1B records and to match incomplete records with donors are defined in Figure 29.

The LS-1B records were sorted so that records for libraries of similar schools were near each other on the file. They were sorted in this order: AFFLG / ENR / LEVEL / URB / M051. M051 was the number of books held in the library at the end of the 1992-93 school year.

Figure 30 shows the variables used to match incomplete records and donors for each LS-1B item imputed during the second stage. The order of collapse for the variables is also shown in Figure 30.

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Indian school library media centers (LS-1C) - Because there were only 127 completed records[17] (interviews) for Indian school libraries and the item response rates were high for most items, the second stage of imputation was done clerically. Other than the use of a variable that indicated whether the school was operated by BIA (BIAOP), the methodology was the same as that used to impute items on the LS-1A and LS-1B files, which were imputed by computer. For records where items had missing values, similar records (libraries for schools of same BIA type, similar size, level, etc.) were selected as donors. The variables used to clerically match incomplete records and donors were STATE, ENR, LEVEL, and BKCLSZ, which are defined in Figure 27, and BIAOP, which is defined in Figure 18.

Clerical Imputation for Public and Private School Library Media Centers

These items were clerically imputed for some cases with missing values: 1, 2, 3, 4, 5, 6, 7, and 25.

10.2.9 Imputation Procedures: Public, Private, and Indian School Library Media Specialist/Librarian Questionnaires (LS-2A, LS-2B, LS-2C)

Data were imputed to items with missing values in the three stages described below. Figure 1b shows the percentage of entries imputed in each stage for items where the response rate was less than 75 percent.

First Stage Imputation for Librarians

In the first stage, items with missing values were completed whenever possible by using information about the school librarian from these sources:

1. *Other questionnaire items on the librarian record* - Based on entries from related items on the librarian record, some assumptions were made about how the respondent should have answered items with missing values. For example, if the respondent did not report whether he/she was certified (in item 17a) and item 12 indicated that he/she did not have a bachelor's degree, the assumption was made that the respondent was not a certified library media specialist and "No" was imputed to item 17a. Items that may have been completed by using data from other LS-2A/2B/2C entries are listed in Figure 31.

2. *The matching Library Media Center Questionnaire (LS-1A/1B/1C)* - If items related to educational background were unanswered on the librarian record, information from the matching library questionnaire was used to complete the items whenever possible. For example, if item 12a (whether respondent has bachelor's degree) were unanswered and the LS-1 indicated all professional staff had a bachelor's degree or higher, "Yes" was imputed to item 12a of the librarian record. Items 12a, 13a, 14, and 17 were imputed using information from LS-1.

Second Stage Imputation for Librarians

In general, the second stage of imputation filled unanswered items by using data from the record for a librarian at a similar school, i.e., a school that was the same level, of similar size, located in same type of community, etc. Variables that described certain characteristics of the schools (e.g., enrollment size and instructional level) were copied from the matching school record. In addition, variables that described some characteristics of the librarian (e.g., age and highest degree earned) were created from the LS-2 data. These school and librarian variables were used to sort the librarian records and to match incomplete records to those with complete entries (donors).

For some items, such as item 21 (respondent's attitudes about work), data were directly copied to the

[17] This number is less than the number of Indian school (SASS-3C) records because some Indian schools refused to complete the library questionnaire and some did not have libraries.

record with the missing value. For others, such as item 11 (number of years that respondent had worked as a school librarian), entries on the donor record were used as factors along with other information on the incomplete record to fill the items with missing values. For example, if item 11 were unanswered for Librarian #1, donor's ratio of years worked to number of years since first job as school librarian began would have been used with the number of years since Librarian#1 began his/her first job as a school librarian.

Public school librarians (LS-2A) - The variables used to sort the LS-2A records to match incomplete records with donors are defined in Figure 32.

The LS-2A records were sorted so that records for librarians at similar schools were near each other on the file. They were sorted in this order: STATE / LEVEL / ENR / URB / LEANUMBR / L180. LEANUMBR was a code that identified the school district for which the respondent worked and L180 was the respondent's year of birth.

Figure 33 shows the variables that were used to match incomplete records and donors for each LS-2A item that was imputed during the second stage. The order of collapse for the variables is also shown in Figure 33.

Private school librarians (LS-2B) - The variables used to sort the LS-2B records and match incomplete records with donors are defined in Figure 34.

The LS-2B records were sorted so that records for librarians at similar schools were near each other on the file. They were sorted in this order: AFFLG / LEVEL / ENR / URB / L180. L180 was the respondent's year of birth.

Figure 35 shows the variables used to match incomplete records and donors for each LS-2B item imputed during the second stage. The order of collapse for the variables is also shown in Figure 35.

Indian school librarians (LS-2C) - Because there were only 98 complete records (interviews) for Indian school librarians and the item response rates were high for most items, the second stage of imputation was done clerically. Other than the use of a variable that indicated whether the school was operated by the BIA (BIAOP), the methodology was the same as that used to impute items on the LS-2A file, which was imputed by computer. For records where items had missing values, similar records (librarians of similar age and educational background who worked at schools of same BIA type, similar size, level, etc.) were selected as donors. The variables used to clerically match incomplete records and donors were STATE, ENR, LEVEL, BKCLSZ, AGE, HIGHDEG, and FULPART, which are defined in Figure 32, and BIAOP, which is defined in Figure 18.

Clerical Imputation for Public and Private School Librarians

These items were clerically imputed for some cases with missing values: 10a, 14, 18, 26, 28.

10.2.10 Imputation Flags

Entries imputed to the SASS records are identified by flags that denote the stage or type of imputation: 1 = ratio adjustment to original entry; 2 = other stage 1 imputation (use of other questionnaire data, sample file, etc.); 3 = stage 2 imputation (use of donor); 4 = clerical imputation; 0 = not imputed.

The variable names for these flags consist of F_ (F *underscore*) and the variable name for the data entry. For example, the flag for variable S0470 on the public school file would be named F_S0470.

Figure 1b.--Percent of SASS Entries Imputed in Each Stage[1] for Items Where Response Rate Was Less Than 75 Percent

Item[2]	Stage 1 (Percent)	Stage 2 (Percent)	Clerical (Percent)
LEAs			
26c (years)	0.0	33.3	0.0
Public-School Principals (SASS-2A)			
14b(1)	30.0	0.3	0.0
14b(2)	31.0	0.3	0.0
14b(4)	30.7	0.3	0.0
14b(5)	33.8	0.3	0.0
14b(7)	25.9	0.3	0.0
14b(8)	34.7	0.3	0.0
Private School Principals (SASS-2B)			
14b(1)	25.3	0.3	0.0
14b(2)	27.5	0.4	0.0
14b(4)	26.9	0.5	0.0
14b(5)	29.8	0.5	0.0
14b(8)	27.6	0.5	0.0
21a	1.0	25.1	0.0
21c	0.5	35.1	0.0
28b	0.0	45.5	0.0
Indian School Principals (SASS-2C)			
14b(8)	0.0	0.0	28.4
Private Schools (SASS-3B)			
31c(2)	0.0	25.7	0.0
31c(5)	0.0	25.5	0.0
31c(6)	0.0	26.3	0.0
31c(7)	0.0	28.9	0.0
31c(8)	0.0	25.2	0.0
31c(9)	0.0	26.8	0.0
Indian Schools (SASS-3C)			
45	0.0	0.0	30.0
Public School Teachers (SASS-4A)			
41c	0.0	27.5	1.2
Private School Teachers (SASS-4B)			
39	26.9	0	0.0
51c	0.8	24.8	0.1
55	0.0	36.0	0.0

Figure 1b.--Percent of SASS Entries Imputed in Each Stage[1] for Items Where Response Rate Was Less Than 75 Percent

Item[2]	Stage 1 (Percent)	Stage 2 (Percent)	Clerical (Percent)
Indian School Teachers (SASS-4C)			
2	0.0	18.8	12.5
4	0.0	18.2	9.1
9c	11.3	16.5	0.0
39	30.7	0.0	0.0
41c	0.0	24.2	6.1
53b(3) amount	0.0	37.2	0.0
55	0.0	34.7	0.0
Public School Library Media Centers (LS-1A)	9.1	18.8	0.5
5a(4)	14.0	17.8	0.0
5b(2)	0.0	28.1	0.0
5b(4)	9.9	15.2	0.0
5c(4)	37.4	5.4	0.7
25			
Private School Library Media Centers (LS-1B)	10.4	18.6	0.3
5b(2)	1.4	23.4	0.3
5b(4)	12.0	12.9	0.6
5c(3)	26.5	5.3	2.2
25			
Indian School Library Media Centers (LS-1C)	33.1	0.0	5.5
25			
Public School Librarians (LS-2A)			
14d(PhD)	0.0	23.7	2.6
18b(5)	23.6	2.0	0.1
18b(6)	34.6	2.0	0.1
18b(7)	35.4	2.0	0.1
18b(8)	36.7	2.0	0.1
18b(9)	36.1	2.0	0.1
18b(10)	29.6	2.0	0.1

Figure 1b.--Percent of SASS Entries Imputed in Each Stage[1] for Items Where Response Rate Was Less Than 75 Percent

Item[2]	Stage 1 (Percent)	Stage 2 (Percent)	Clerical (Percent)
Private School Librarians (LS-2B)			
14c(ed.spec.)	0.0	26.9	0.0
14d(ed.spec.)	0.0	23.9	6.0
14c(PhD)	0.0	22.7	4.5
14d(PhD)	0.0	18.2	9.1
18b(1)	22.8	2.8	0.0
18b(4)	24.9	2.8	0.0
18b(5)	24.0	2.8	0.0
18b(6)	42.3	2.8	0.0
18b(7)	45.4	2.8	0.0
18b(8)	46.8	2.8	0.0
18b(9)	46.4	2.8	0.0
18b(10)	35.8	2.8	0.0
26d	6.3	27.9	1.2
Indian School Librarians (LS-2C)			
18b(4)	29.6	0.0	1.4
18b(6)	38.0	0.0	2.8
18b(7)	40.8	0.0	2.8
18b(8)	39.4	0.0	2.8
18b(9)	40.8	0.0	2.8
18b(10)	35.2	0.0	2.8

[1]Stage 1 imputation included procedures 1, 2, and 3 described in the first paragraph of section 10.2 of this chapter. Stage 2 imputation was the "hot deck" method, or procedure 4 in that paragraph.

[2]The wording for these questionnaire items can be found in SASS and PSS Questionnaires: 1993-94, U.S. Department of Education, National Center for Education Statistics, NCES 94-674.

Figure 2.--Teacher Demand and Shortage Questionnaire (SASS-1A) Items[1] Imputed by Using Other Data on Record

Imputed Item	Source Items
10	5
23	22, 24
24	22, 23
26	5

Figure 3.--Teacher Demand and Shortage Questionnaire (SASS-1A) Items Imputed by Using School Data from the SASS-3A Record[2]

TDS Items (SASS-1A)	School Source Items (SASS-3A)
5 a-n	7 a-n
7	9
15a	20a (if value = 2)
17	18
19	16e & 17e
22	26
23	27
24	28

[1]The wording for these questionnaire items can be found in SASS and PSS Questionnaires: 1993-94, U.S. Department of Education, National Center for Education Statistics, NCES 94-674.

[2]This imputation procedure was used only for one-school LEAs.

Figure 4.--Teacher Demand and Shortage Questionnaire (SASS-1A) Imputation Variables

Variable Name	Description	Values
ENR	Number of students by categories	1 = None 2 = 1-999 students 3 = 1,000-9,999 4 = 10,000-990,000 5 = Unknown
GROUP[1]	Groups of states with similar LEAs	1 = Connecticut, Rhode Island 2 = Delaware, District of Columbia, Maryland 3 = Maine, New Hampshire, Vermont 4 = Massachusetts, New York 5 = New Jersey, Pennsylvania 6 = Illinois, Indiana 7 = Iowa, Nebraska 8 = Kansas, Oklahoma 9 = Michigan, Ohio 10 = Minnesota, Missouri, Wisconsin 11 = North Dakota, South Dakota 12 = Alabama, Louisiana 13 = Arkansas, Mississippi, West Virginia 14 = Florida, Texas 15 = Georgia, Virginia 16 = Kentucky, South Carolina 17 = North Carolina, Tennessee 18 = Alaska, Wyoming 19 = Arizona, Nevada, Utah 20 = California, Hawaii 21 = Colorado, Washington 22 = Idaho, Montana 23 = New Mexico, Oregon
LEVEL	Instructional levels in LEA	1 = Elementary only 2 = Combined, more elementary students than secondary 3 = Combined, comparable elementary and secondary student counts (or all students are ungraded) 4 = Combined, more secondary students than elementary 5 = Secondary only
MSC91	Type of community where LEA is located	1 = Large central city of an SMSA 2 = Medium city of an SMSA 3 = Urban fringe of a large city 4 = Urban fringe of a medium city 5 = Large town, not in an SMSA 6 = Small town, not in an SMSA 7 = Rural 8 = Unknown
MINEN	Percent minority enrollment code	1 = Less than 5.5% are of minority race or ethnic origin 2 = 5.5% - 20.4% 3 = 20.5% - 50.4% 4 = Unknown 5 = 50.5% or more

[1]The variable GROUP was created because the District of Columbia and some states (e.g., Hawaii and Delaware) have few LEAs, combining states made more LEA records available as donor sources.

Figure 5.--Teacher Demand and Shortage Questionnaire (SASS-1A)
Matching Variables and Collapse Order

Items	Matching Variables	Order of Collapse
5	GROUP, LEVEL, ENR	ENR
10	GROUP, LEVEL, ENR	ENR, LEVEL
19, 20, 21	GROUP, LEVEL, ENR	LEVEL
8	STATE, LEVEL, MSC91	LEVEL
11, 14, 26, 27	STATE, LEVEL, MSC91	MSC91, LEVEL
29, 31, 32, 33	STATE, LEVEL, MSC91	LEVEL, MSC91
13	GROUP, LEVEL, MSC91	MSC91, LEVEL
22	GROUP, LEVEL, MSC91	MSC91
7	GROUP, MINEN, MSC91	MINEN, MSC91
17, 23, 24, 25	GROUP, MINEN, MSC91	MSC91, MINEN
30	STATE, LEVEL, MSC91	LEVEL
9, 16, 18, 34, 35, 36, 37, 38, 39, 40, 41, 42	STATE, MSC91, ENR	ENR, MSC91
12, 15, 28	GROUP, MSC91, ENR	ENR, MSC91

Figure 6.--School Principal Questionnaire (SASS-2A/2B) Imputation Variables

Variable name	Description	Values
NLEVEL	Instructional level of school	1 = Elementary 2 = Combined, more elementary than secondary 3 = Combined, comparable elementary and secondary student counts (or all students are ungraded) 4 = Combined, more secondary than elementary 5 = Secondary
URB	Type of community where school is located	1 = Large central city of SMSA 2 = Medium city of SMSA 3 = Urban fringe of a large city 4 = Urban fringe of a medium city 5 = Large town, not in SMSA 6 = Small town, not in SMSA 7 = Rural 8 = Unknown
AFFILS (SASS-2B only)	School's religious affiliation and/or association membership	1 = Catholic, parochial 2 = Catholic, diocesan 3 = Catholic, private 4 = Catholic, unclassified 5 = Member of conservative Christian school association 6 = Other schools with religious affiliation or orientation not included in categories 1-5 7 = Religious schools, unknown affiliation/association 8 = Secular school - regular program 9 = Secular school - special program, vocational or alternative 10 = Secular school - special education 11 = Secular school - unknown program 12 = Unknown
AFFLG (SASS-2B only)	General affiliation code	1 = Catholic 2 = Other religious affiliation or orientation 3 = Secular 4 = Unknown
ANNSAL (SASS-2B only)	Private school principal's annual salary	1 = 0-$12,999 2 = $13,000-$17,999 3 = $18,000-$21,999 4 = $22,000-$28,999 5 = $29,000-$32,999 6 = $33,000 or more 7 = Unknown

Figure 6.--School Principal Questionnaire (SASS-2A/2B) Imputation Variables (Continued)

Variable name	Description	Values
ANNSAL (SASS-2A only)	Public school principal's annual salary	1 = 0-$35,299 2 = $35,300-$38,599 3 = $38,600-$41,999 4 = $42,000-$46,999 5 = $47,000-$53,799 6 = $53,800 or more 7 = Unknown
AGE	Age of respondent	1 = 21-29 years old 2 = 30-45 3 = 45-60 4 = 61-90 5 = Unknown
YRPRINSC	Years as principal of this school	1 = 0-3 years 2 = 4-15 3 = 16-30 4 = 31-70
EDUEXP	Work experience in education	1 = 0-3 years 2 = 4-15 3 = 16-30 4 = 31 or more years
EDUYRS	Number of years in education	Sum of years reported in items 11a, 14b(3)(years), 14b(4)(years), 14b(5)(years), 17a, and 17b
YEARPRIN	Years as principal in all schools	1 = 0-3 years 2 = 4-15 3 = 16-30 4 = 31 years or more

Figure 7.--Public School Principal (SASS-2A) Matching Variables and Collapse Order for Items 1-21

Items	Matching Variables	Order of Collapse
5b, 5e, 5g, 10c (Associate)	NLEVEL, AGE	AGE, NLEVEL
7b, 8b, 9b, 10c (Ed. Specialist & Doctorate), 11	NLEVEL, EDUEXP, AGE	AGE, EDUEXP, NLEVEL
7c, 9c	NLEVEL, AGE, YEARPRIN	YEARPRIN, AGE, NLEVEL
10b, 14	NLEVEL, AGE, EDUEXP	EDUEXP, AGE, NLEVEL
17	NLEVEL, YEARPRIN, AGE	AGE, YEARPRIN, NLEVEL
12	NLEVEL, EDUEXP	EDUEXP, NLEVEL
13, 15, 20	NLEVEL, YEARPRIN, EDUEXP	EDUEXP, YEARPRIN, NLEVEL
18	NLEVEL, YEARPRIN	YEARPRIN, NLEVEL
19	EDUEXP, YEARPRIN, NLEVEL	NLEVEL, YEARPRIN, EDUEXP
21	NLEVEL, AGE, YEARPRIN, EDUEXP	EDUEXP, YEARPRIN, AGE, NLEVEL

Figure 8.--Public School Principal (SASS-2A) Matching Variables and Collapse Order for Items 22 and UP

Items	Matching Variables	Order of Collapse
22 (A495 & A500)	NLEVEL, URB, YRPRINSC, AGE	AGE, YRPRINSC, URB, NLEVEL
22 (A500 only)	NLEVEL, URB, ANNSAL	ANNSAL, URB, NLEVEL
23, 24, 25, 26	NLEVEL, URB, YRPRINSC	YRPRINSC, URB, NLEVEL
28, 29	NLEVEL, URB	URB, NLEVEL

Figure 9.--Private School Principal (SASS-2B) Matching Variables and Collapse Order for Items 1-21

Items	Matching Variables	Order of Collapse
5b, 5e, 5g, 10c (Associate)	AFFILS, NLEVEL, AGE	AGE, NLEVEL, AFFILS
7b, 8b, 9b, 10c (Ed. Specialist & Doctorate), 11	AFFILS, NLEVEL, EDUEXP, AGE	AGE, EDUEXP, NLEVEL, AFFILS
7c, 9c	AFFILS, NLEVEL, AGE, YEARPRIN	YEARPRIN, AGE, NLEVEL, AFFILS
10b, 14	AFFILS, NLEVEL, AGE, EDUEXP	EDUEXP, AGE, NLEVEL, AFFILS
17	AFFILS, NLEVEL, YEARPRIN, AGE	AGE, YEARPRIN, NLEVEL, AFFILS
12	AFFILS, NLEVEL, EDUEXP	EDUEXP, NLEVEL, AFFILS
13, 15, 20	AFFILS, NLEVEL, YEARPRIN, EDUEXP	EDUEXP, YEARPRIN, NLEVEL, AFFILS
18	AFFILS, NLEVEL, YEARPRIN	YEARPRIN, NLEVEL, AFFILS
19	AFFILS, EDUEXP, YEARPRIN, NLEVEL	NLEVEL, YEARPRIN, EDUEXP, AFFILS
21	NLEVEL, AGE, YEARPRIN, EDUEXP	EDUEXP, YEARPRIN, AGE, NLEVEL

Figure 10.--Private School Principal (SASS-2B) Matching Variables and Collapse Order for Items 22 and Up

Items	Matching Variables	Order of Collapse
22 (A495 & A500)	AFFILS, NLEVEL, YRPRINSC, AGE	AGE, YRPRINSC, NLEVEL, AFFILS
22 (A500 only)	AFFILS, NLEVEL, URB, ANNSAL	ANNSAL, URB, NLEVEL, AFFILS
23, 24, 25, 26	AFFILS, NLEVEL, URB, YRPRINSC	YRPRINSC, URB, NLEVEL, AFFILS
28, 29	AFFILS, NLEVEL, URB	URB, NLEVEL, AFFILS

Figure 11.--Public School Questionnaire (SASS-3A) Items Imputed by Using Other Data on Record

Imputed Item	Source Items
7	14
13	14
14	22, 15
15	14
16	17, 22
17	16, 22
21	22
22	27, 16, 17
24	9
25	7
26	25
27	28, 26
28	27, 26
29	7
30	29

Figure 12.--Public School Questionnaire (SASS-3A) Items Imputed Using LEA Data

SASS-3A Items	LEA Source Items (SASS-1A)
7	5[1]
9	7
16e & 17e	19
18	17
26	22
27	23
28	24

[1]LEA data were used to impute item 7 of the school record only when the sample school was the only school operated by the LEA.

Figure 13.--Public School Questionnaire (SASS-3A) Imputation Variables

Variable Name	Description	Values
LEVEL	Instructional level of school	1 = Elementary 2 = Combined or ungraded 3 = Secondary
TYPE	Type of school	1 = Regular 2 = Special education 3 = Vocational education 4 = Alternative 5 = Unknown
URB	Type of community where school is located	1 = Large central city of an SMSA 2 = Medium city of an SMSA 3 = Urban fringe of a large city 4 = Urban fringe of a medium city 5 = Large town, not in an SMSA 6 = Small town, not in an SMSA 7 = Rural 8 = Unknown
MINEN	Percent minority enrollment	1 = 0-5.4% are of minority race or ethnic origin 2 = 5.5-20.4% 3 = 20.5-50.4% 5 = 50.5-100% 4 = Unknown

Figure 14.--Public School Questionnaire (SASS-3A) Matching Variables and Collapse Ordering

Items	Matching Variables	Order of Collapse
7, 12, 23, 25, 26, 29, 30, 33	STATE, LEVEL, TYPE	TYPE
10, 13, 16, 17, 22	STATE, TYPE, LEVEL	LEVEL, TYPE
11, 32	STATE, LEVEL, MINEN	MINEN
20, 31	STATE, LEVEL, MINEN	MINEN, LEVEL
27, 28	STATE, MINEN, LEVEL	LEVEL, MINEN
9, 18, 21	STATE, MINEN, URB	URB, MINEN
15, 24	STATE, MINEN, URB	URB
19	STATE, URB, MINEN	MINEN

Figure 15.--Private School Questionnaire (SASS-3B) Items[1] Imputed by Using Other Data on Record

Imputed Item	Source Items
23 (PSS item 13)	7 (PSS item 8)
38c (PSS item 17)	38b (PSS item 16b)
21	22, 34, 39c
22	16, 21, 23, 34, 39c
26	6, 23, 37
33	34
34	6, 21, 22, 39
36	8
37	6
39	38, 40
40	38, 39
41	6
42	6

[1]The wording for these questionnaire items can be found in SASS and PSS Questionnaires: 1993-94, U.S. Department of Education, National Center for Education Statistics, NCES 94-674.

Figure 16.--Private School Questionnaire (SASS-3B) Imputation Variables

Variable Name	Description	Values
AFFLG	General affiliation	1 = Catholic 2 = Other religious affiliation 3 = No religious affiliation 4 = Unknown
AFFILR	Specific religious affiliation	1 = Catholic 2 = Amish 3 = Assembly of God 4 = Baptist 5 = Calvinist 6 = Christian 7 = Church of Christ 8 = Church of God 9 = Disciples of Christ 10 = Episcopal 11 = Friends 12 = Greek Orthodox 13 = Islamic 14 = Jewish 15 = Latter Day Saints 16 = Lutheran Church - Missouri Synod 17 = Evangelical Lutheran Church in America 18 = Wisconsin Evangelical Lutheran Synod 19 = Other Lutheran 20 = Mennonite 21 = Methodist 22 = Pentecostal 23 = Presbyterian 24 = Seventh-Day Adventist 25 = Other 26 = No religious affiliation 27 = Unknown
AFFILS	Religious affiliation and/or association membership	1 = Catholic, parochial 2 = Catholic, diocesan 3 = Catholic, private 4 = Catholic, unclassified 5 = Member of conservative Christian school association 6 = Other schools with religious affiliation and/or association membership not included in codes 1-5 7 = Religious schools, unknown affiliation or association 8 = Secular - regular elementary and/or secondary 9 = Secular - special program, vocational, or alternative 10 = Secular - special education 11 = Secular - unknown program 12 = Unknown

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Figure 16.--Private School Questionnaire (SASS-3B) Imputation Variables (Continued)

Variable Name	Description	Values
ENR	School enrollment size code	1 = 1-149 students 2 = 150-399 3 = 400 or more 4 = Unknown
URB	Type of community where school is located	1 = Large central city of an SMSA 2 = Medium city of an SMSA 3 = Urban fringe of a large city 4 = Urban fringe of a medium city 5 = Large town, not in an SMSA 6 = Small town, not in an SMSA 7 = Rural 8 = Unknown
LEVEL	Instructional level of school	1 = Elementary 2 = Combined or ungraded 3 = Secondary 4 = Unknown
TYPE	School type	1 = Regular 2 = Special education 3 = Vocational education 4 = Alternative 5 = Unknown
MINEN	Percent minority enrollment	1 = 0-5.4% are of minority race or ethnic origin 2 = 5.5-20.4% 3 = 20.5-50.4% 5 = 50.5-100% 4 = Unknown
REGION	Census geographic region where school is located	1 = Northeast 2 = Midwest 3 = South 4 = West
UNGRADE	School organization	1 = All students are ungraded (not assigned to grades 1, 2, etc.) 2 = Some or all students are assigned to grade levels
PKPROG	Prekindergarten school	1 = School teaches only prekindergarten-age children 2 = School teaches students at kindergarten level or higher

Figure 17a.--SASS Private School Questionnaire (SASS-3B) Matching Variables and Collapse Ordering for PSS Items

Items	Matching Variables	Order of Collapse
6 (PSS item 7)	LEVEL, AFFLG	AFFLG, LEVEL
44 (PSS item 9)	LEVEL, AFFLG, AFFILS	AFFILS, AFFLG, LEVEL
8 (PSS item 10)	AFFLG, AFFILS, URB	URB, AFFILS
11 (PSS item 11)	AFFLG, AFFILS, TYPE	TYPE, AFFILS
12 (PSS item 12)	LEVEL, AFFLG, AFFILS	AFFILS, AFFLG
23 (PSS item 13)	LEVEL, AFFLG	AFFLG, LEVEL
16 (PSS item 14)	AFFILS, UNGRADE	AFFILS
38a,b (PSS item 16)	PKPROG, AFFILS, TYPE	TYPE
38c (PSS item 17)	LEVEL, AFFLG	AFFLG, LEVEL
13 (PSS item 18)	AFFLG, AFFILS	AFFILS
14 (PSS item 19)	AFFLG, AFFILS, TYPE	TYPE
20 (PSS item 20)	AFFLG, AFFILS, TYPE	TYPE, AFFILS

Figure 17b.--SASS Private School Questionnaire (SASS-3B) Matching Variables and Collapse Ordering for Non-PSS Items

Items	Matching Variables	Order of Collapse
9, 18, 19, 27, 41, 42, 43, 45, 46, 47, 48, 49, 50, 51	AFFLG, LEVEL, TYPE, URB	URB, TYPE, LEVEL
15	AFFLG, TYPE, LEVEL, URB	URB, LEVEL
21, 22, 31, 32, 34	AFFLG, TYPE, LEVEL, URB	URB, LEVEL, TYPE
10, 35, 37	AFFLG, LEVEL, ENR, URB	URB, ENR, LEVEL
26	AFFLG, LEVEL, ENR, URB	URB, ENR
24, 39, 40	AFFLG, MINEN, URB, ENR	ENR, URB, MINEN
33, 36	AFFLG, MINEN, URB	URB, MINEN
25, 28, 29, 30, 52, 53, 54, 55, 56, 57	AFFLG, URB, ENR	ENR, URB

Figure 18.--Teacher Questionnaire (SASS-4A/4B/4C) Imputation Variables

Variable Name	Description	Values
HIGHDEG	Highest degree received	1 = Associate or no degree 2 = Bachelor's 3 = Master's or higher
AGE	Age of respondent	1 = Under 30 years old 2 = 30-45 3 = 46-60 4 = 61-94 5 = Unknown
TEAEXPER	Years teaching in all schools	1 = 0-3 years 2 = 4-15 3 = 16-30 4 = 31-70 5 = Unknown
TEAFIELD	Teaching assignment field	1 = Prekindergarten, kindergarten, or general elementary 2 = Special areas other than foreign language, science, vocational education, and special education 3 = Foreign language 4 = Science 5 = Vocational education 6 = Special education 7 = All others
FULPTIME	Full-time/part-time status	1 = Full-time teacher 2 = Part-time teacher 3 = All others
TEALEVEL	Instructional level for teacher	1 = Elementary, prekindergarten and special education 2 = All others
GRADELEV	Grade levels taught this year	1 = Prekindergarten 2 = Grades K-6 3 = Grades K-8 4 = Grades 7-12 5 = Postsecondary 6 = Unknown
ENROLMNT	Number of students enrolled in the school	Number of students reported on school record (1-9000)
ENR (SASS-4A only)	Enrollment size code for public school	1 = 1-299 students 2 = 300-599 3 = 600 or more 4 = Unknown
ENR (SASS-4B and 4C)	Enrollment size code for private or Indian school	1 = 1-149 students 2 = 150-399 3 = 400 or more 4 = Unknown

Figure 18.--Teacher Questionnaire (SASS-4A/4B/4C) Imputation Variables (Continued)

Variable Name	Description	Values
STGROUP (SASS-4A only)	Groups of states with similar schools	1 = Connecticut and Rhode Island 2 = Delaware, District of Columbia, Maryland 3 = Maine, New Hampshire, Vermont 4 = Massachusetts, New York 5 = New Jersey, Pennsylvania 6 = Illinois, Indiana 7 = Iowa, Nebraska 8 = Kansas, Oklahoma 9 = Michigan, Ohio 10 = Minnesota, Missouri, Wisconsin 11 = North Dakota, South Dakota 12 = Alabama, Louisiana 13 = Arkansas, Mississippi, West Virginia 14 = Florida, Texas 15 = Georgia, Virginia 16 = Kentucky, South Carolina 17 = North Carolina, Tennessee 18 = Alaska, Wyoming 19 = Arizona, Nevada, Utah 20 = California, Hawaii 21 = Colorado, Washington 22 = Idaho, Montana 23 = New Mexico, Oregon
URB	Type of community where school is located	1 = Large central city of SMSA 2 = Medium city of SMSA 3 = Urban fringe of a large city 4 = Urban fringe of a medium city 5 = Large town, not in SMSA 6 = Small town, not in SMSA 7 = Rural 8 = Unknown
BEGINTEA	Years since beginning first teaching position	1 = 0-3 years 2 = 4-7 3 = 8-15 4 = 16-24 5 = 25-68
MINEN	Percent minority enrollment at school	1 = Less than 5.5% are of minority race or ethnic origin 2 = 5.5%-20.4% 3 = 20.5%-50.4% 5 = 50.5%-100% 4 = Unknown

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Figure 18.--Teacher Questionnaire (SASS-4A/4B/4C) Imputation Variables (Continued)

Variable Name	Description	Values
AFFILS (SASS-4B only)	Religious affiliation and/or association	1 = Catholic, parochial 2 = Catholic, diocesan 3 = Catholic, private 4 = Catholic, unclassified 5 = Member of conservative Christian school association 6 = Other schools with religious affiliation and/or association membership not included in codes 1-5 7 = Religious schools, unknown affiliation or association 8 = Secular school - regular program 9 = Secular school - special program, vocational, or alternative 10 = Secular - special education 11 = Secular - unknown program 12 = Unknown
AFFLG (SASS-4B only)	General affiliation code for school	1 = Catholic 2 = Other religious affiliation or orientation 3 = Secular 4 = Unknown
BIAOP (SASS-4C only)	Type of BIA school	1 = School is funded and operated by Bureau of Indian Affairs (BIA) 2 = School is funded by BIA but operated by a tribe or other organization

Figure 19.--Public School Teacher (SASS-4A) Matching Variables and Collapse Ordering

Items	Matching Variables	Order of Collapse
59	STGROUP, STATE, TEALEVEL, BEGINTEA	BEGINTEA, STATE
20b, 15b, 15e, 15g, 17b, 18b, 19b, 20c	STGROUP, STATE, TEALEVEL, URB	URB, STATE
2, 3, 4	STGROUP, STATE, TEALEVEL, URB, ENR	ENR, URB, STATE
6, 7, 8, 11, 9, 10, 12, 13, 14	STGROUP, STATE, TEALEVEL, AGE, HIGHDEG	HIGHDEG, AGE, STATE
21c, 25c, 26, 29, 28, 30, 31, 32, 33, 34, 35	STGROUP, STATE, TEALEVEL, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG, STATE
22, 23, 24	STGROUP, STATE, TEALEVEL, AGE, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG, STATE
37, 38, 41, 42,	STGROUP, STATE, TEALEVEL, FULPTIME, TEAEXPER	TEAEXPER, FULPTIME, STATE
40b	STGROUP, TEALEVEL	TEALEVEL
43	STGROUP, STATE, TEALEVEL, URB, FULPTIME, ENR, GRADELEV	GRADELEV, ENR, FULPTIME, STATE
44, 45, 46, 47, 48, 51, 52	STGROUP, STATE, TEALEVEL, URB, AGE, TEAEXPER	TEAEXPER, AGE, STATE
49, 50	STGROUP, STATE, TEALEVEL, URB, TEAEXPER, FULPTIME, GRADELEV	GRADELEV, FULPTIME, TEAEXPER, STATE
53, 54, 57, 58, 60	STGROUP, STATE, TEALEVEL, URB, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG, STATE
55, 61, 62	STGROUP, STATE, TEALEVEL, URB, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG, TEALEVEL, STATE
63	STGROUP, STATE, TEALEVEL, URB, MINEN, TEAFIELD, GRADELEV	GRADELEV, TEAFIELD, MINEN, URB, STATE

Figure 20.--Private School Teacher (SASS-4B) Matching Variables and Collapse Ordering

Items	Matching Variables	Order of Collapse
59	AFFILS, TEALEVEL, BEGINTEA	BEGINTEA, AFFILS
20b, 15b, 15e, 15g, 17b, 18b, 19b, 20c	AFFILS, TEALEVEL, URB	URB, AFFILS
2, 3, 4	AFFILS, TEALEVEL, URB, ENR	ENR, URB, AFFILS
6, 7, 8, 11, 9, 10, 12, 13, 14	AFFILS, TEALEVEL, AGE, HIGHDEG	HIGHDEG, AGE, AFFILS
21c, 25c, 26, 29, 28, 30, 31, 32, 33, 34, 35	AFFILS, TEALEVEL, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG, AFFILS
22, 23, 24	AFFILS, TEALEVEL, AGE, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG, AFFILS
37, 38, 41, 42,	AFFILS, TEALEVEL, FULPTIME, TEAEXPER	TEAEXPER, FULPTIME, AFFILS
40b	AFFILS, TEALEVEL	TEALEVEL
43	AFFILS, TEALEVEL, URB, FULPTIME, ENR, GRADELEV	GRADELEV, ENR, FULPTIME, AFFILS
44, 45, 46, 47, 48, 51, 52	AFFILS, TEALEVEL, URB, AGE, TEAEXPER	TEAEXPER, AGE, AFFILS
49, 50	AFFILS, TEALEVEL, URB, TEAEXPER, FULPTIME, GRADELEV	GRADELEV, FULPTIME, TEAEXPER, AFFILS
53, 54, 57, 58, 60	AFFILS, TEALEVEL, URB, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG, AFFILS
55, 61, 62	AFFILS, TEALEVEL, URB, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG, TEALEVEL, AFFILS
63	AFFILS, TEALEVEL, URB, MINEN, GRADELEV	GRADELEV, MINEN, URB, AFFILS

Figure 21.--Indian School Teacher (SASS-4C) Matching Variables and Collapse Ordering

Items	Matching Variables	Order of Collapse
59	BIAOP, TEALEVEL, BEGINTEA	BEGINTEA
20b, 15b, 15e, 15g, 17b, 18b, 19b, 20c	BIAOP, TEALEVEL	No collapsing
2, 3, 4	BIAOP, TEALEVEL, ENR	ENR
6, 7, 8, 11, 9, 10, 12, 13, 14	BIAOP, TEALEVEL, AGE, HIGHDEG	HIGHDEG, AGE
21c, 25c, 26, 29, 28, 30, 31, 32, 33, 34, 35	BIAOP, TEALEVEL, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG
22, 23, 24	BIAOP, TEALEVEL, AGE, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG
37, 38, 41, 42,	BIAOP, TEALEVEL, FULPTIME, TEAEXPER	TEAEXPER, FULPTIME
40b	BIAOP, TEALEVEL	TEALEVEL
43	BIAOP, TEALEVEL, FULPTIME, ENR, GRADELEV	GRADELEV, ENR, FULPTIME
44, 45, 46, 47, 48, 51, 52	BIAOP, TEALEVEL, AGE, TEAEXPER	TEAEXPER, AGE
49, 50	BIAOP, TEALEVEL, TEAEXPER, FULPTIME, GRADELEV	GRADELEV, FULPTIME, TEAEXPER
53, 54, 57, 58, 60	BIAOP, TEALEVEL, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG
55, 61, 62	BIAOP, TEALEVEL, HIGHDEG, TEAEXPER	TEAEXPER, HIGHDEG, TEALEVEL
63	BIAOP, TEALEVEL TEAFIELD, GRADELEV	GRADELEV, TEAFIELD

Figure 22.--Student Records Questionnaire (SASS-5) Imputation Variables

Variable Name	Description	Values
NLEVEL	Instructional level of school	1 = Elementary 2 = Combined, more elementary than secondary 3 = Combined, comparable elementary and secondary student counts (or all students are ungraded) 4 = Combined, more secondary than elementary 5 = Secondary
URB	Type of community where school is located	1 = Large central city of SMSA 2 = Medium city of SMSA 3 = Urban fringe of a large city 4 = Urban fringe of a medium city 5 = Large town, not in SMSA 6 = Small town, not in SMSA 7 = Rural 8 = Unknown
AFFILS (private school students only)	School's religious affiliation and/or association membership	1 = Catholic, parochial 2 = Catholic, diocesan 3 = Catholic, private 4 = Catholic, unclassified 5 = Member of conservative Christian school association 6 = Other schools with religious affiliation or orientation not included in categories 1-5 7 = Religious schools, unknown affiliation/association 8 = Secular school - regular program 9 = Secular school - special program, vocational or alternative 10 = Secular school - special education 11 = Secular school - unknown program 12 = Unknown
AFFLG (private school students only)	General affiliation code	1 = Catholic 2 = Other religious affiliation or orientation 3 = Secular 4 = Unknown
GRLEVEL	Student's grade level	1 = Any of grades 1-6 2 = Grade 7 or 8 3 = Grade 9 or 10 4 = Grade 11 or 12
INDPER	Percentage of American Indian students in school	1 = 19.5% or more students are Indian 2 = Less than 19.5% students are Indian 3 = Unknown

Figure 22.--Student Records Questionnaire (SASS-5) Imputation Variables (Continued)

Variable Name	Description	Values
GROUP	States grouped for Indian school student file	1 = Arizona 2 = New Mexico 3 = South Dakota 4 = North Dakota 5 = All other states
GPA	Grade point average based on school's grading system	1 = 0-.9 on 0 to 4.0 scale 0-1.2 on 0 to 5.0 scale 0-24.9 on 0 to 100 scale 2 = 1-1.4 on 0 to 4.0 scale 1.3-1.8 on 0 to 5.0 scale 25-36.9 on 0 to 100 scale 3 = 1.5-1.9 on 0 to 4.0 scale 1.9-2.4 on 0 to 5.0 scale 37-49.9 on 0 to 100 scale 4 = 2.0-2.4 on 0 to 4.0 scale 2.5-3.0 on 0 to 5.0 scale 50-61.9 on 0 to 100 scale 5 = 2.5-2.9 on 0 to 4.0 scale 3.1-3.7 on 0 to 5.0 scale 62-74.9 on 0 to 100 scale 6 = 3.0-3.4 on 0 to 4.0 scale 3.8-4.3 on 0 to 5.0 scale 75-86.9 on 0 to 100 scale 7 = 3.5-3.9 on 0 to 4.0 scale 4.4-4.9 on 0 to 5.0 scale 87-99.9 on 0 to 100 scale 8 = 4.0-5.0 on 0 to 4.0 scale 5.0 on 0 to 5.0 scale 100.0 on 0 to 100 scale 9 = A to E scale A to F scale Other scale 10 = Unknown

Figure 23.--Public School Students (SASS-5A) Matching Variables and Collapse Order

Items	Matching Variables	Order of Collapse
6, 12, 13	INDPER, URB, GRLEVEL	GRLEVEL, URB, INDPER
7	INDPER, URB, NLEVEL	NLEVEL, URB, INDPER
8, 18, 26	INDPER, TYPE, GRLEVEL	GRLEVEL, TYPE, INDPER
9, 11, 14	INDPER, GRLEVEL, URB	URB, GRLEVEL, INDPER
15, 16, 17, 19	INDPER, TYPE, GRLEVEL, NLEVEL	NLEVEL, GRLEVEL, TYPE, INDPER
23	INDPER, GRLEVEL, NLEVEL	NLEVEL, GRLEVEL, INDPER
24, 25, 27	INDPER, TYPE, GRLEVEL, GPA	GPA, GRLEVEL, TYPE, INDPER

Figure 24.--Private School Students (SASS-5B) Matching Variables and Collapse Order

Items	Matching Variables	Order of Collapse
6	INDPER, URB, GRLEVEL	GRLEVEL, URB, INDPER
7	INDPER, URB, NLEVEL	NLEVEL, URB, INDPER
8, 26	INDPER, TYPE, GRLEVEL	GRLEVEL, TYPE, INDPER
9	INDPER, GRLEVEL, URB	URB, GRLEVEL, INDPER
11, 14	INDPER, AFFILS, GRLEVEL, URB	URB, GRLEVEL, AFFILS, INDPER
12, 13	INDPER, AFFILS, URB, GRLEVEL	GRLEVEL, URB, AFFILS, INDPER
15, 16	INDPER, TYPE, AFFILS, GRLEVEL, NLEVEL	NLEVEL, GRLEVEL, AFFILS, TYPE, INDPER
17, 19	INDPER, TYPE, GRLEVEL, NLEVEL	NLEVEL, GRLEVEL, TYPE, INDPER
18	INDPER, TYPE, AFFILS, GRLEVEL	GRLEVEL, AFFILS, TYPE, INDPER
23	INDPER, AFFILS, GRLEVEL, NLEVEL	NLEVEL, GRLEVEL, AFFILS, INDPER
24, 25	INDPER, TYPE, GRLEVEL, GPA	GPA, GRLEVEL, TYPE, INDPER
27	INDPER, TYPE, AFFILS, GRLEVEL, GPA	GPA, GRLEVEL, AFFILS, TYPE, INDPER

Figure 25.--Indian School Students (SASS-5C) Matching Variables and Collapse Order

Items	Matching Variables	Order of Collapse
6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 23, 26	GROUP, GRLEVEL	GRLEVEL, GROUP
24, 25, 27	GROUP, GRLEVEL, GPA	GPA, GRLEVEL, GROUP

Figure 26.--Library Media Center Questionnaire (LS-1A/1B/1C) Items[1] Imputed by Using Other Data on Record

Imputed Item	Source Items
1a	1b, 2
1b	1a
2	1a, 1b
3	2
5	6, 11, 12, 27
6	5
7	11, 12, 27
11	7, 12
12	11
15	13
16	13
27	5

[1]The wording for these questionnaire items can be found in SASS and PSS Questionnaires: 1993-94, U.S. Department of Education, National Center for Education Statistics, NCES 94-674.

Figure 27.--Public School Library Media Center (LS-1A) Imputation Variables

Variable Name	Description	Values
ENR	Enrollment size code for school	1 = 1-299 students 2 = 300-599 3 = 600 or more 4 = Unknown
LEVEL	Instructional level of school	1 = Elementary 2 = Combined or ungraded 3 = Secondary
URB	Type of community where school is located	1 = Large central city of SMSA 2 = Medium city of SMSA 3 = Urban fringe of a large city 4 = Urban fringe of a medium city 5 = Large town, not in SMSA 6 = Small town, not in SMSA 7 = Rural 8 = Unknown
TYPE	Type of school	1 = Regular 2 = Special education 3 = Vocational education 4 = Alternative 5 = Unknown
BKCLSZ	Library book collection size	1 = 1-5,000 books 2 = 5,001-10,000 3 = 10,001-15,000 4 = 15,001-20,000 5 = More than 20,000 6 = Unknown

Figure 28.--Public School Library Media Center (LS-1A) Matching Variables and Collapse Ordering

Items	Matching Variables	Order of Collapse
11, 12	ENR, BKCLSZ, LEVEL	LEVEL, BKCLSZ, ENR
5(1)	ENR, LEVEL, TYPE	TYPE, LEVEL, ENR
5(2)-5(6), 6, 7	ENR, BKCLSZ, LEVEL	LEVEL, BKCLSZ, ENR
1c, 2, 3, 4, 10, 14	ENR, LEVEL, BKCLSZ	BKCLSZ, LEVEL, ENR
17	LEVEL, BKCLSZ, ENR	ENR, BKCLSZ, LEVEL
18, 19, 20	BKCLSZ, ENR, LEVEL	LEVEL, ENR, BKCLSZ
21, 22, 23, 24, 25	ENR, LEVEL, BKCLSZ	BKCLSZ, LEVEL, ENR
26, 27	BKCLSZ, ENR, LEVEL	LEVEL, ENR, BKCLSZ
9, 13, 15	ENR, LEVEL, URB	URB, LEVEL, ENR
8, 16, 28	LEVEL, ENR, TYPE	TYPE, ENR, LEVEL

Figure 29.--Private School Library Media Center (LS-1B) Imputation Variables

Variable Name	Description	Values
AFFLG	General affiliation of school	1 = Catholic 2 = Other religious affiliation 3 = No religious affiliation 4 = Unknown
ENR	Enrollment size code for school	1 = 1-149 students 2 = 150-399 3 = 400 or more 4 = Unknown
LEVEL	Instructional level of school	1 = Elementary 2 = Combined or ungraded 3 = Secondary
URB	Type of community where school is located	1 = Large central city of SMSA 2 = Medium city of SMSA 3 = Urban fringe of a large city 4 = Urban fringe of a medium city 5 = Large town, not in SMSA 6 = Small town, not in SMSA 7 = Rural 8 = Unknown
BKCLSZ	Library book collection size	1 = 1-5,000 books 2 = 5,001-10,000 3 = 10,001-15,000 4 = 15,001-20,000 5 = More than 20,000 6 = Unknown

Figure 30.--Private School Library Media Center (LS-1B) Matching Variables and Collapse Ordering

Items	Matching Variables	Order of Collapse
11, 12	AFFLG, ENR, LEVEL	LEVEL, ENR, AFFLG
5(1)	ENR, LEVEL, AFFLG	AFFLG, LEVEL, ENR
5(2)-5(6), 6, 7, 1c	AFFLG, ENR, BKCLSZ, LEVEL	LEVEL, BKCLSZ, ENR, AFFLG
1d, 1e	AFFLG, ENR, BKCLSZ, LEVEL	LEVEL, BKCLSZ, ENR
2, 3, 4	AFFLG, ENR, BKCLSZ, LEVEL	LEVEL, BKCLSZ, ENR, AFFLG
10	ENR, LEVEL, AFFLG	AFFLG, LEVEL, ENR
17, 18, 19, 20, 21, 22, 23, 24	BKCLSZ, ENR, LEVEL	LEVEL, ENR, BKCLSZ
25	ENR, LEVEL, BKCLSZ	BKCLSZ, LEVEL, ENR
26, 27	BKCLSZ, ENR, LEVEL	LEVEL, ENR, BKCLSZ
9, 13, 15	AFFLG, ENR, LEVEL, URB	URB, LEVEL, ENR, AFFLG
8, 16, 28	LEVEL, ENR, AFFLG	AFFLG, ENR, LEVEL

Figure 31.--Library Media Specialist/Librarian Questionnaire (LS-2A/2B/2C) Items[1] Imputed by Using Other Data on Record

Imputed Item	Source Items
1	2, 3, 5
5	1
10	7, 11, 12
11	7, 10, 12
12a	13a, 14b, 11, 12, 27
12c	32
13a	14b
14b (associate degree)	32
17a	12a
28	26, 33
32	12c, 14d
34	35

[1]The wording for these questionnaire items can be found in SASS and PSS Questionnaires: 1993-94, U.S. Department of Education, National Center for Education Statistics, NCES 94-674.

Figure 32.--Public School Library Media Specialist/Librarian (LS-2A) Imputation Variables

Variable Name	Description	Values
ENR	Enrollment size code for school	1 = 1-299 students 2 = 300-599 3 = 600 or more 4 = Unknown
LEVEL	Instructional level of school	1 = Elementary 2 = Combined or ungraded 3 = Secondary
URB	Type of community where school is located	1 = Large central city of SMSA 2 = Medium city of SMSA 3 = Urban fringe of a large city 4 = Urban fringe of a medium city 5 = Large town, not in SMSA 6 = Small town, not in SMSA 7 = Rural 8 = Unknown
BKCLSZ	Library book collection size	1 = 1-5,000 books 2 = 5,001-10,000 3 = 10,001-15,000 4 = 15,001-20,000 5 = More than 20,000 6 = Unknown
MINEN	Percent minority enrollment at school	1 = 0-5.4% are of minority race or ethnic origin 2 = 5.5-20.4% 3 = 20.5-50.4% 5 = 50.5-100% 4 = Unknown
AGE	Respondent's age category	1 = Less than 30 years old 2 = 30-45 3 = 46-60 4 = More than 60
LIBEXP	Years as a librarian in all schools	1 = 1-3 years 2 = 4-15 3 = 16-30 4 = More than 30 5 = Unknown
HIGHDEG	Highest degree earned by respondent	1 = Associate degree or no degree 2 = Bachelor's degree 3 = Master's degree or higher
FUL-PART	Full-time/part-time status	1 = Full-time librarian at this school 2 = Part-time librarian at this school 3 = Unknown

Figure 33.--Public School Library Media Specialist/Librarian (LS-2A) Matching Variables and Collapse Ordering

Items	Matching Variables	Order of Collapse
3, 5, 1, 4, 6	ENR, LEVEL, BKCLSZ, URB	URB, BKCLSZ, LEVEL, ENR
19	LEVEL, ENR, BKCLSZ, URB	URB, BKCLSZ, ENR, LEVEL
8, 10, 11	AGE, LIBEXP, HIGHDEG	HIGHDEG, LIBEXP, AGE
9, 12b, 12e, 13b	LEVEL, AGE, LIBEXP, URB	URB, LIBEXP, AGE, LEVEL
13c, 14d	AGE, LIBEXP, LEVEL, URB	URB, LEVEL, LIBEXP, AGE
14c, 21, 22	LEVEL, AGE, LIBEXP, URB	URB, LIBEXP, AGE, LEVEL
23	AGE, LIBEXP, LEVEL, URB	URB, LEVEL, LIBEXP, AGE
29	LEVEL, AGE, LIBEXP, URB	URB, LIBEXP, AGE, LEVEL,
17c	LIBEXP, AGE, HIGHDEG, LEVEL	LEVEL, HIGHDEG, AGE, LIBEXP
33, 34, 35, 36, 15	AGE, HIGHDEG, LIBEXP, LEVEL	LEVEL, LIBEXP, HIGHDEG, AGE
16, 17b	HIGHDEG, LEVEL, LIBEXP, AGE	AGE, LIBEXP, LEVEL, HIGHDEG
18, 20	LEVEL, FUL-PART, HIGHDEG	HIGHDEG, FUL-PART, LEVEL
24, 25, 26, 28, 27	STATE, HIGHDEG, LEVEL, LIBEXP, FUL-PART, URB	URB, FUL-PART, LIBEXP, LEVEL, HIGHDEG
30, 31	STATE, MINEN, URB, LIBEXP	LIBEXP, URB, MINEN

Figure 34.--Private School Library Media Specialist/Librarian (LS-2B) Imputation Variables

Variable Name	Description	Values
AFFLG	General affiliation of school	1 = Catholic 2 = Other religious affiliation 3 = No religious affiliation 4 = Unknown
ENR	Enrollment size code for school	1 = 1-149 students 2 = 150-399 3 = 400 or more 4 = Unknown
LEVEL	Instructional level of school	1 = Elementary 2 = Combined or ungraded 3 = Secondary
URB	Type of community where school is located	1 = Large central city of SMSA 2 = Medium city of SMSA 3 = Urban fringe of a large city 4 = Urban fringe of a medium city 5 = Large town, not in SMSA 6 = Small town, not in SMSA 7 = Rural 8 = Unknown
BKCLSZ	Library book collection size	1 = 1-5,000 books 2 = 5,001-10,000 3 = 10,001-15,000 4 = 15,001-20,000 5 = More than 20,000 6 = Unknown
MINEN	Percent minority enrollment at school	1 = 0-5.4% are of minority race or ethnic origin 2 = 5.5-20.4% 3 = 20.5-50.4% 5 = 50.5-100% 4 = Unknown
AGE	Respondent's age category	1 = Less than 30 years old 2 = 30-45 3 = 46-60 4 = More than 60
LIBEXP	Years as a librarian in all schools	1 = 1-3 years 2 = 4-15 3 = 16-30 4 = More than 30 5 = Unknown
HIGHDEG	Highest degree earned by respondent	1 = Associate degree or no degree 2 = Bachelor's degree 3 = Master's degree or higher
FUL-PART	Full-time/part-time status	1 = Full-time librarian at this school 2 = Part-time librarian at this school 3 = Unknown

Figure 35.--Private School Library Media Specialist (LS-2B) Matching Variables and Collapse Ordering

Items	Matching Variables	Order of Collapse
3, 5, 1, 4, 6	AFFLG, ENR, LEVEL, BKCLSZ	BKCLSZ, LEVEL, ENR
19	AFFLG, LEVEL, ENR, BKCLSZ	BKCLSZ, ENR, LEVEL
8, 10, 11	AFFLG, AGE, LIBEXP, HIGHDEG	HIGHDEG, LIBEXP, AGE
9, 12b, 12e, 13b	AFFLG, LEVEL, AGE, LIBEXP	LIBEXP, AGE, LEVEL
13c, 14d	AFFLG, AGE, LIBEXP, LEVEL	LEVEL, LIBEXP, AGE
14c, 21, 22, 29	AFFLG, LEVEL, AGE, LIBEXP	LIBEXP, AGE, LEVEL
23	AFFLG, AGE, LIBEXP, LEVEL	LEVEL, LIBEXP, AGE
17c, 33, 34, 35, 36, 15	AFFLG, AGE, HIGHDEG, LEVEL	LEVEL, HIGHDEG, AGE
16, 17b	AFFLG, HIGHDEG, LEVEL, AGE	AGE, LEVEL, HIGHDEG
18, 20	AFFLG, LEVEL, FUL-PART, HIGHDEG	HIGHDEG, FUL-PART, LEVEL
24, 25, 26	AFFLG, ENR, HIGHDEG, LIBEXP, FUL-PART, URB	URB, FUL-PART, LIBEXP, HIGHDEG, ENR
30, 31	AFFLG, MINEN, URB, LIBEXP	LIBEXP, URB, MINEN

11. Variance Estimation

The previous SASS surveys have used the variance procedure known as balanced half sample replication (BHR). A fundamental problem with BHR is that it assumes sampling is done with replacement. Hence, BHR cannot reflect the increase in precision due to sampling a large proportion of a finite population. For most surveys, where the sampling rates are small, the increase in precision will be small and can safely be ignored. However, with the SASS, the public surveys (school, administrator, TDS, teacher, library and librarian) are designed for reliable state estimates. This necessarily implies large sampling rates, which can lead to very large variance overestimates with BHR. Likewise, the private surveys (school, administrator and teacher) are designed to produce detailed private association estimates, which also imply large sampling rates, and variance overestimation with BHR.

To overcome this problem a bootstrap variance estimator has been implemented for the 1993-94 SASS. The bootstrap variance reflects the increase in precision due to large sampling rates because the bootstrap is done systematically without replacement as was the original sampling. Thus, the bootstrap should better reflect the effect of high sampling rates.

The idea behind bootstrap variance estimation is to use the distribution of the sample weights to generate a bootstrap frame. Bootstrap samples can be selected from the bootstrap frame, replicate weights computed and variances estimated with standard BHR software. The bootstrap replicate basic weights (inverse of the probability of selection) were subsequently reweighted by processing each set of replicate basic weights through the weighting procedure described in section 9. More detail on the bootstrap methodology is provided in articles by Steven Kaufman.[18] These papers describe how the SASS public LEA and SASS school bootstrap replicate weights are computed.

Further analysis of the bootstrap replicate basic weights revealed that approximately 6% of school replicate weights fell outside a 95% confidence interval. This is only slightly higher than the expected 5%, indicating the bootstrap replicate weights are close to normally distributed.

The replicate weights are used to compute the variance of a statistic, Y, as given below.

$$\text{Variance}(Y) = 1/n \sum_r (Y_r - Y)^2$$

Where:

Y_r = the estimate of Y using the rth set of replicate weights

n = the number of replicates (48 for SASS)

Below is a brief description of how the replicates were formed.

11.1 Public School and Administrator Replicates

The data files contain a set of 48 bootstrap replicate weights, which can be used with any BHR software package. If the package requires specifying a variance methodology, BHR can be specified. At this point, variance computation is similar to the previous SASS rounds. The difference is in the use of bootstrap methods to produce the replicate weights.

Public school administrator replicate weights are the same as the school replicate weights.

11.2 Private School and Administrator Replicates

For private schools, the list frame used the bootstrap methodology as described above. For the area frame, the PSU sampling rates were very small, negating the advantage of using the bootstrap.

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[18]For more information about Bootstrap variance methodology and how it applies to SASS see: Efron, B. (1982)., Kaufman, S. (1992), Kaufman, S. (1993), Kaufman, S. (1994), and Sitter, R.R. (1990).

BHR methodology was employed in the area frame as it has for all previous SASS. Half-samples are defined by pairing sample PSUs within each sampling stratum, forming variance strata. The final product is 48 replicate weights. After the variance strata were assigned, an orthogonal matrix was used to form the 48 balanced half-sample replicates. Thus, the same methodology can be applied to both the list frame and the area frame replicate weights to compute variances.

11.3 Library/Librarian Replicates

The library and librarian replicate weights are generally equal to the school bootstrap replicate weight times the conditional probability of selection given the school is selected in the SASS school sample. These adjusted bootstrap replicate weights are provided on the file.

BHR methodology was employed rather than bootstrap in two instances. First, if a school had been selected with certainty and subsequently subsampled for the library survey not with certainty, no bootstrap replicate weights were available, so records were sorted by stratum and order of selection and assigned variance stratum and panel.

The second instance was in the private area frame. These library sample records were assigned replicate weights by multiplying the school BHR replicate weight times the conditional probability of selection given the school is selected in the SASS school sample.

11.4 Teacher Replicates

The teacher replicate weights are generally equal to the school bootstrap replicate weight times the inverse of the conditional probability of selection of the teacher given the school is selected in the SASS school sample. These adjusted bootstrap replicate weights are provided on the file.

BHR methodology was employed rather than bootstrap in two instances. First, if a school had been selected with certainty and subsequently teachers were sampled not with certainty, no bootstrap replicate weights were available, so records were sorted by school stratum, order of selection and control number, then assigned variance stratum and panel.

The second instance was in the private area frame. These teacher sample records were assigned replicate weights by multiplying the school BHR replicate weight times the teacher's conditional probability of selection given the school is selected in the SASS School sample.

11.5 LEA Replicates

To reflect the fact that LEAs were selected through the school, it is important to form LEA replicates using the school replicates. An LEA was placed into an LEA replicate if any of the schools associated with the LEA were in that particular school replicate. Certainty LEAs were placed into all replicates.

LEAs without schools were sorted by order of selection. Pairs of LEAs were then systematically placed into consecutive variance strata and each element of a variance strata was assigned to alternating half-samples. After the variance strata were assigned, an orthogonal matrix was used to form the 48 replicates.

11.6 Student Replicates

Due to the small size of the student sample, BHR methodology was employed to assign replicate weights. Schools not selected for the student sample with certainty were paired to define the variance strata, with each school's associated sample students remaining together. For schools selected for the student sample with certainty, sample teachers were used to define the variance strata. Once the variance strata were formed, an orthogonal matrix was used to form the 48 balanced half-sample replicates.

12. Frame Evaluation

For private schools, the 1991-92 Private School Survey (PSS) was the most complete private school universe. Since it was a private school census conducted by the SASS staff, there was no definitional difference between SASS and PSS. However, some duplicate schools were found when the 1993-94 PSS list updating operations were being performed. The duplicates were deleted and weights adjusted. Also, while the preliminary tape was being reviewed, more duplicate schools were found. The schools were called to verify they were duplicates. The weights were then adjusted for the duplication.

For public schools, the 1991-92 Common Core of Data (CCD) contained the most complete list of public schools in the United States. Nevertheless, some school definitional differences were found between the SASS and the CCD. In some states, intermediate units between LEAs and schools are treated as schools on CCD, while SASS treats each location within each intermediate unit as a school. In California, special education programs are listed on CCD as schools. Los Angeles Special Education Program appeared on CCD as one school record. However, it had 136 locations; and 30 of the 136 were special education programs operating in regular schools not listed on the CCD. Other special education programs in California had similar idiosyncracies. We obtained from the state of California a universe file of all locations for all special education programs. We included the special education programs listed on the CCD for the school sampling procedure. We then replaced each selected program with an average of one location operating in regular schools not listed on the CCD.

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Acknowledgments

The authors would like to thank Dennis Schwanz and Leroy Bailey of the Bureau of the Census and Dan Kasprzyk, Marilyn McMillen, Mike Cohen, Ralph Lee, and Andrew Kolstad of the National Center for Education Statistics for reviewing this document.

Special thanks to Thelma Willis, Sue Chandler, Sandy Carnegie, and Vicki Travers of the Bureau of the Census for word processing support.

We also thank Mia Perona of Pinkerton Computer Consultants, Inc. for reformatting the manuscript for publication.

Appendices

Appendix 1

Descriptions of the Common Core of Data and the Private School Survey

Common Core of Data:

The Common Core of Data (CCD) is the Center's primary database on elementary and secondary public education in the United States. CCD is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data comparable across all states.

The objectives of the CCD are twofold. First, it provides an official listing of public elementary and secondary schools and school districts in the nation, which can be used to select samples for other NCES surveys. Second, it provides basic information and descriptive statistics on public elementary and secondary schools and schooling in general.

For more information about the CCD, see these two publications:
U.S. Department of Education. Office of Education Research and Improvement. National Center for Education Statistics. 1993. *Public Elementary and Secondary Schools and Agencies in the United States and Outlying Areas: School Year 1991-92*. Washington, DC. NCES 93-328.

U.S. Department of Education. Office of Education Research and Improvement. National Center for Education Statistics. 1995. *Directory of Public Elementary and Secondary Education Agencies, 1993-94*. Washington, DC. NCES 95-321.

The Private School Survey

Because of concern about alternatives in education, the interest and need for data on private education has also increased. NCES has recognized this need and has determined that a private elementary and secondary school data collection comparable to the Common Core of Data universe survey for public schools is an NCES priority.

The purposes of this data collection activity are to:

a. build an accurate and complete list of private schools to serve as a sampling frame for NCES surveys of private schools;

b. generate biannual data on the total number of private schools, teachers, and students in the universe (the most recent survey took place in 1993 - 94)

For more information about the PSS, see:
Broughman, Stephen. 1996. *Private School Universe Survey, 1993-94*. U.S. Department of Education. National Center for Education Statistics. Washington, DC. NCES 96-143.

Appendix 2

Controlling the School Overlap with the 1991 SASS

This appendix describes how the original 1993-94 SASS selection probabilities were adjusted so that the expected number of overlap schools between the 1990-91 and 1993-94 SASS can be set at a specific level without changing a school's overall selection probability for the 1993-94 SASS. To do this required knowledge of the 1990-91 and 1993-94 SASS selection probabilities for all schools in the frame. The 1993-94 SASS school sample selection will be dependent upon the 1990-91 SASS sample.

Since the overall probability of selection was the original 1993-94 SASS selection probability, the basic weights are the reciprocal of the original 1993-94 SASS school selection probability.

The details of this process are described below. First, required terminology and sets of schools are defined. Next, the definition of conditional selection probabilities are defined. Selecting the 1990-91 SASS sample with these conditional probabilities maintains the original 1990-91 SASS school selection probabilities, while controlling the expected overlap.

Terminology

S_1: 1990-91 SASS sample

S_2: 1993-94 SASS sample

i: school

$P_{h'i}(S_1)$:probability of selecting school i from stratum h' in the 1990-91 SASS.

$P_{hi}(S_2)$:probability of selecting school i from stratum h in the 1993-94 SASS.

$P_{hi}(S_2|S_1)$:probability of selecting school i from stratum h in 1993-94 SASS given that this school was selected for 1990-91 SASS.

$P_{h'i}(NS_1)$: probability of not selecting school i from stratum h' in 1990-91 SASS.

$P_{hi}(S_2|NS_1)$:probability of selecting school i from stratum h in the 1993-94 SASS given that this school was not selected for the 1990-91 SASS.

Conditional Selection Probabilities

Initially, we set $C_h = 1$ and computed preliminary conditional probabilities of selection for 1993-94 SASS according to the following formulae:

$$P_{hi}(S_2|S_1) = C_h \text{ , if } P_{hi}(S_2) \geq P_{h'i}(S_1) \text{ and } P_{h'i}(S_1) + P_{hi}(S_2) \leq 1$$

$$P_{hi}(S_2|S_1) = C_h \frac{P_{hi}(S_2)}{P_{h'i}(S_1)} \text{ , if } P_{hi}(S_2) < P_{h'i}(S_1) \text{ and } P_{h'i}(S_1) + P_{hi}(S_2) \leq 1$$

$$P_{hi}(S_2|S_1) = \frac{P_{h'i}(S_1) + P_{hi}(S_2) - 1}{P_{h'i}(S_1)} \text{ , if } P_{h'i}(S_1) + P_{hi}(S_2) > 1$$

$$P_{hi}(S_2|NS_1) = \frac{P_{hi}(S_2) - P_{h'i}(S_1)C_h}{1 - P_{h'i}(S_1)} \text{ , if } P_{hi}(S_2) \geq P_{h'i}(S_1) \text{ and } P_{h'i}(S_1) + P_{hi}(S_2) \leq 1$$

$$P_{hi}(S_2|NS_1) = \frac{P_{hi}(S_2)(1 - C_h)}{1 - P_{h'i}(S_1)} \text{ , if } P_{hi}(S_2) < P_{h'i}(S_1) \text{ and } P_{h'i}(S_1) + P_{hi}(S_2) \leq 1$$

$$P_{hi}(S_2|NS_1) = 1 \text{ , if } P_{h'i}(S_1) + P_{hi}(S_2) > 1$$

The next step was to use these preliminary conditional probabilities to compute final values for C_h as shown below:

$$C_h = \frac{M_h - M_{sh}}{M_{rh}}$$

$$M_{sh} = \sum_{i \in Ph' i(S_1) + P_{hi}(S_2) > 1} P_{hi}(S_2|S_1)$$

$$M_{rh} = \sum_{i \in Ph' i(S_1) + P_{hi}(S_2) \leq 1} P_{hi}(S_2|S_1)$$

M_h is the expected overlap sample size for stratum h.

The final step was to compute final conditional probabilities using the final values for C_h and the same formulae as used to compute the initial conditional probabilities as shown above. It can be verified that these conditional selection probabilities will preserve the original 1993-94 SASS selection probabilities, $P_{hi}(S_2)$, while the expected overlap between 1993-94 SASS schools and 1990-91 SASS schools is equal to M_h. M_h's were chosen based on the following percentage of expected overlap in table 25 below:

Table 25.--Expected and actual school overlap from 1991 and 1994 by Association

Public Schools:	30%	
Private Schools:		
Association	**Expected Overlap**	**Actual Overlap**
01 Military Schools	100%	100%
02 Catholic	30%	29%
03 Friends	100%	100%
04 Episcopal	34%	34%
05 National Hebrew Day	24%	22%
06 Solomon Schechter	100%	100%
07 Other Jewish	19%	16%
08 Lutheran - Missouri Synod	30%	28%
09 Lutheran - Wisconsin Synod	30%	36%
10 Evangelical Lutheran Church	100%	100%
11 Other Lutheran	30%	32%
12 Seventh-Day Adventist	30%	30%
13 Christian Schools International	30%	24%
14 American Association of Christian Schools	0%	0%
15 National Association of Private Schools for Exceptional Children	23%	21%
16 Montessori	21%	19%
17 National Association of Independent Schools	8%	14%
18 National Independent Private School Association[1]	-	-
19 All Else	1%	1%

See Table 20 for the expected and actual overlap sample sizes.
[1] National Independent Private School Association was a newly defined stratum in 1993-94 SASS.

Appendix 3

Categories Used in the Weighting for Enrollment and Number of Teachers

		Enrollment Categories
Regular Public School (3A) Noninterview Adjustment		
	Elementary	299 or less
		300-499
		500 or more
	Combined	99 or less
		100-299
		300 or more
	Secondary	449 or less
		450-849
		850 or more
- Native American Schools (3A) Noninterview Adjustment		
- BIA (3c) Noninterview Adjustment		
- Native American Schools (3A) First Stage Factors		299 or less
		300 or more
- Private School (3B) Noninterview Adjustment	Elementary	199 or less
		200 or more
	Combined	149 or less
		150 or more
	Secondary	349 or less
		350 or more
- Private School (3B) Second Stage		149 or less
		150 - 299
		300 - 499
		500 - 749
		750 - more

Appendix 3 (Continued)

Categories Used in the Weighting for Enrollment and Number of Teachers

		Enrollment Categories
- Teacher Demand and Shortage (1A) Noninterview Adjustment and First Stage Factors		299 or less 300 - 599 600 - 999 1000 - 2499 2500 - 4999 5000 - 9999 10,000 - 24,999 25,000 or more
- BIA Teachers (4C) List Form Nonresponse Factor		299 or less 300 or more
		Number of Teachers
- Public Teachers (4A) List Form Nonresponse Factor	Native American	19.9 or less 20.0 or more
	Regular Public	14.9 or less 15.0 + 29.9 30.0 or more
- Private Teachers (4B) List Form Nonresponse Factor (List Frame)	Elementary	10.0 or less 10.1 or more
	Combined	15.0 or less 15.1 or more
	Secondary	30.0 or less 30.1 or more

Appendix 3 (Continued)

Categories Used in the Weighting for Enrollment and Number of Teachers

		Number of Teachers
(Area Frame)	Elementary	7.9 or less
		8.0 or more
	Combined	8.9 or less
		9.0 or more
	Secondary	29.9 or less
		30.0 or more
		Enrollment Categories
- Public Teachers (4A)		
First Stage Factors	Native American	299 or less
Teacher Adjustment Factor		300 or more
- Public Teachers (4A)		
Teacher Adjustment Factor		
(Regular Public)	Elementary	300 or less
		301 - 480
		481 - 700
		701 or more
	Combined	150 or less
		151 - 400
		401 - 800
		801 or more
	Secondary	400 or less
		401 - 800
		801 - 1400
		1401 or more
- BIA Library/Librarian (LS-1C, 2C)		
Type A Noninterview Adjustment		299 or less
Second Stage Adjustment		300 or more

Appendix 3 (Continued)

Categories Used in the Weighting for Enrollment and Number of Teachers

		Enrollment Categories
- Public Library/Librarian (LS-1A, 2A)		
Type A Noninterview Adjustment		
Second Stage Adjustment	Elementary	299 or less
		399 - 499
		500 or more
	Combined	99 or less
		100 - 299
		300 or more
	Secondary	449 or less
		450 - 849
		850 or more
- Private Library/Librarian (LS-1B, 2B)		
Type A Noninterview Adjustment		
First Stage Adjustment	Elementary	110 or less
Third Stage Adjustment		111 - 200
		201 -310
		311 or more
	Combined	110 or less
		111 - 270
		271 - 520
		521 or more
	Secondary	175 or less
		176 - 325
		326 - 575
		576 or more
Second Stage Adjustment		149 or less
		150 - 299
		300 - 499
		500 - 749
		750 or more
- BIA Students (5C)		
School Nonresponse Adjustment		299 or less
Student Noninterview Adjustment		300 or more
Student Adjustment Factor		

Appendix 3 (Continued)

Categories Used in the Weighting for Enrollment and Number of Teachers

		Enrollment Categories
- Public Students (5A)		
School Nonresponse Adjustment		
Student Noninterview Adjustment		
Student Adjustment Factor		299 or less
(Native American)		300 or more
(Regular Public)	Elementary	299 or less
		300 - 499
		500 or more
	Combined	99 or less
		100 - 299
		300 or more
	Secondary	449 or less
		450 - 849
		850 or more
- Private Students (5B)		
School Nonresponse Adjustment		
Student Noninterview Adjustment		
Student Adjustment Factor	Elementary	200 or less
		201 or more
	Combined	150 or less
		151 or more
	Secondary	350 or less
		351 or more

Appendix 4

Derivation of the Student Basic Weight

To come up with a student basic weight, we first attempted to derive an unbiased estimator of the student probability of selection. Since this unbiased estimator was impossible to implement, we show a modification which was implemented.

Let

$$W'_{is} = \begin{cases} 0 \text{ if unit } i \notin s \\ \text{Weight if unit } i \in s \end{cases} \qquad \text{for all possible samples } s$$

$$Y_i = \text{Value for unit } i$$

Then

$$\sum_{i=1}^{N} W'_{is}\, Y_i \text{ is unbiased, if } E\,(W'_{is}) = 1 = \sum_{s} W'_{is}\, P(s)$$

For each school's class period, p, and student, i, let W_{ip} be the weight to be defined. Let $X_{ip}(s) = 1$ if student i is selected from period p, or zero otherwise.

Let

$$W'_{is} = \sum_{p=1}^{P} X_{ip}(s)\, W_{ip}$$

$$\sum (W'_{is}) = \sum_{s} \left(\sum_{p} X_{ip}(s)\, W_{ip} \right) P(s)$$

$$= \sum_{p} W_{ip} \sum_{s} X_{ip}(s)\, P(s)$$

$$= \sum_{p} W_{ip}\, P\left(X_{ip}(s) = 1\right)$$

Where:

$$P\left(X_{ip}(s) = 1\right) = P(\text{teacher } t(p) \in s) \cdot P(p \in s / t(p) \in s)\ P(i \in s / p \in s)$$

$$= P(\text{teacher is selected}) \cdot P(\text{class is selected given the teacher is selected}) \cdot$$

$$. P(\text{student is selected given the class period is selected})$$

$$= \frac{1}{SI_{t(p)}} \cdot \left[\frac{N_{kji}}{P(t(p))}\right] \cdot \left[\frac{2}{N(p)}\right]$$

When computing the probability of selecting student i's class, it will be assumed that all classes student i has with teacher j have the same class size. This assumption is needed because collecting all necessary class sizes was too large a respondent burden.
Where:

$SI_{t(p)}$ = sampling interval of teacher's stratum
P(t(p)) = number of class periods taught by the sample teacher
N(p) = number of students in the selected class period

$$So,\ W_{ip} = \frac{L_{kj}}{N_{kji}} \cdot \frac{S_{kj}}{2} \cdot \frac{TP_{kj}}{p(i)}$$

Where:

N_{kji} = The total number of times, within school k, that student i has teacher j each week.

L_{kj} = the total number of periods the sample teacher teaches an eligible class at the sample school per week.

TP_{kj} = Inverse of the teacher probability of selection for the student sample adjusted for teachers erroneously classified as not teaching regularly scheduled classes.

S_{kj} = size (enrollment) of the sample class period.

p(i) = number of classes taken by the student

Then

$$E\left(W'_{is}\right) = \sum_{j=1}^{P(i)} P\left(X_{ip}(s) = 1\right) W_{ip}$$

If we sum over the periods taken by student i

$$= \sum_{j=1}^{P(i)} \frac{\frac{1}{TP_{kj}} \cdot \left[\frac{N_{kji}}{L_{kj}}\right] \cdot \left[\frac{2}{S_{kj}}\right] \cdot \left[\frac{L_{kj}}{N_{kji}}\right] \cdot \left[S_{kj} TP_{kj}\right]}{2 \cdot p(i)}$$

$$= \sum_{j=1}^{p(i)} = \frac{1}{p(i)} = 1$$

Thus, W_{ip} is unbiased

The dilemma comes about in estimating p(i), which is not collected.

Since the weight is unbiased, it was felt a reasonable approximation could be obtained by summing the within-school student weight without p(i) and controlling to the school's enrollment:

$$W_{ki} = \left[\frac{L_{kj}}{N_{kji}} S_{kj} TP_{kj}/2\right] \bullet \frac{SchoolEnrollment}{\sum_{i=1}^{6}\left[\frac{L_{kj}}{N_{kji}} \cdot S_{kj} TP_{kj}/2\right]}$$

where W_{ki} = the weight for student i from school k.

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Appendix 5

Effect of Changes to the Student Adjustment Factors in the SASS Student Weighting

After reviewing the final-weighted estimates for public schools by race, it was noticed that the standard errors of these estimates were exceedingly large and the distribution by race and grade level was severely biased. This bias was primarily caused by collapsing of the student adjustment cells. In order to remedy the situation, the collapsing criteria for factor range were relaxed to 3.0 and 0.3. The weights for American Indian students from regular public schools were also truncated at 18,000, and the weight redistributed to other American Indian students from regular public schools. As a further refinement, the order of collapsing was altered to collapse across enrollment size first, then grade level, and finally race.

These three changes caused the bias in the race by grade level estimates to be reduced considerably. The changes also greatly reduced the variance of estimates of American Indian students by grade level.

Presented in Table 26 below are the changes in the bias, standard error, and mean-squared error for race by grade level totals from the student sample. The mean-squared error was computed as the sum of the sample variance and the squared bias introduced by the Student Adjustment Factor.

"Original" refers to the estimates using Student Adjustment cell definitions as originally applied, where there was no truncation of weights, factors had to be in the range of 0.66 and 1.5, and cells were collapsed in the order of race, then enrollment category and finally grade level.

"Final" refers to the estimates using the final set of Student Adjustment cells resulting from truncating the American Indian weights to 18,000 before calculating the Student Adjustment Factors, relaxing the collapsing criteria to the range 0.3 and 3.0, and changing the collapsing order to enrollment category, grade level, and then race.

Table 26.--Mean-Squared Errors for Student Sample Estimates Before and After Weighting Changes (Race by Grade Level)

Race/Grade Level	Bias		Standard Error		Mean-Squared Error	
	Original	Final	Original	Final	Original	Final
Native American:						
Elementary	131,571	10,231	145,225	24,478	3.84E10	7.04E08
Secondary	-14,549	-3,320	51,940	17,076	2.91E09	3.03E08
Combined	-8,470	-8,208	4,217	5,750	8.95E07	1.00E08
Total	108,552	-1,296	156,952	20,652	3.64E10	4.28E08
Asian/Pacific Islander:						
Elementary	278,904	-218	158,607	245,577	1.03E11	6.03E10
Secondary	-337,666	-78,594	105,579	204,882	1.25E11	4.82E10
Combined	10,828	78,985	18,935	67,772	4.76E08	1.08E10
Total	-605,743	172	203,541	222,662	4.08E11	4.96E10
Hispanic:						
Elementary	-132,155	-2,062	387,700	159,855	1.68E11	2.56E10
Secondary	-67,102	-2,312	350,051	72,511	1.27E11	5.26E09
Combined	-27,538	-169	36,035	27,913	2.06E09	7.79E08
Total	-226,796	-4,543	593,985	179,197	4.04E11	3.21E10
Black:						
Elementary	2,076	1,860	438,406	107,385	1.92E11	1.15E10
Secondary	77,192	-125	370,007	57,953	1.43E11	3.36E09
Combined	-20,876	266	68,052	20,971	5.07E09	4.40E08
Total	58,392	2,000	565,751	118,458	3.23E11	1.40E10
White:						
Elementary	281,450	902	665,111	221,559	5.22E11	4.91E10
Secondary	338,949	1,938	206,288	230,952	1.57E11	5.33E10
Combined	45,194	827	86,350	49,206	9.50E09	2.42E09
Total	665,594	3,667	745,320	288,248	9.99E11	8.31E10

Source: 1993-94 SASS Public student sample file.

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